

THE NEW YORK ACADEMY OF MEDICINE

VOL. I

NOVEMBER, 1925

No. 9

THE CHARCOT CENTENARY

(November 25, 1925)

The year 1825 was fairly remarkable in the history of medicine. About one hundred years ago, the Weber brothers began certain fundamental investigations which were the starting point of psychophysics and published their classic on wave motion, which obliterated Bichat's theory that the pulse is synchronous in all the arteries. Purkinje completed his investigations on the subjective phenomena of vision and discovered the germinal vesicle. Louis published his classic on phthisis, in which medical statistics were employed for the first time as a method of investigation. Bouillaud described aphasia and Matthew Baillie first noted floating kidney. Dumas isolated menthol. Nobili invented his astatic galvanometer. Copeland introduced the exhibition of potassium iodide in syphilis. Croton oil was introduced by the apothecary Short. Airy first employed spherical cylinders for astigmatism and Fuchs devised a means of avoiding fires in theaters by coating the woodwork with soluble water glass or with sodium wolframite. In this year, too, Chareot, Huxley, Max Schultze and Henry Gray were born. The centric event of medical moment was therefore the birth, on November 25, 1825, of Jean Martin Charcot, the greatest neuro-pathologist of France and, whether as consultant or teacher, unquestionably the greatest physician of his time.

The son of a carriage-maker, who permitted the most studious of his children to follow medicine, Charcot, after his graduation in 1853, experienced some difficulty in winning his *concours*, in

other words his right to teach medicine in the Faculty. He was no orator, no match for the facile rhetoricians who were his competitors, and it was only through his masterly discussion of his opponent's thesis that he won his spurs. This bout revealed, in fact, a knowledge of the foreign literature of medicine surprising in a young student and almost unequalled in France, where German literature was taboo. Expertise of this kind could have but one outcome. In 1862, Charcot took over the service of the Salpêtrière, where he had served as interne, and at that time officially an almshouse for old women, a somewhat shabby group of buildings at the extreme east end of Paris, containing no less than 5,000 inmates. As interne, Charcot had been early impressed with this motley collection of mal-assorted diseases of all kinds, which he saw at once as a mine of neurological material like nothing else in the world. The way in which he transformed this "pandemonium of infirmities" as he called it, into a well ordered neurological clinic of vast dimensions is the most fascinating episode in the history of clinical medicine. He began by sorting out the gouty and rheumatic patients, the febrile and neurotic disorders of old age, and, in connection with his incumbency of the chair of pathology (1872-82) made masterly and memorable studies of the diseases of the liver, the kidneys and the lungs (1877). That the chair of pathology in the Paris Faculty should have been held by three neurologists—Vulpian, Charcot, and Marie—has been the subject of much pleasantry. When Marie succeeded Victor Cornil in 1908, Osler said it was "very much as if Allan Starr or Dana were selected as successor to Prudden." But as Strümpell, in his beautiful eulogy of Charcot, has said, "no one could be a neurologist, in this early formative period, without being also a pathologist." And Charcot was the greatest of neuro-pathologists. Strümpell shows, by many instances, how Charcot's work on localization of functions of the brain and cord, *viâ* clinical and post mortem findings, did more for the subject than physiological experimentation, which was still haphazard and tentative. Amyotropic lateral sclerosis, which the Germans call Charcot's disease, was the first recorded instance of a lesion affecting an entire tract of nerve-fiber, from cerebro-spinal axis to muscle. Charcot also was the first to de-

scribe the multiplex semeiology of hysteria, thus separating it from epilepsy and insanity. Later in life, he first stressed the fact that, in these "major neuroses," a psychic trauma may play the same part as a pathological lesion. Freud, on his own showing, got from Charcot his idea of a psycho-sexual trauma as the momentum of energy or of inertia in the psycho-neuroses. But there is hardly a phase of modern neurology in which the great master of the Salpêtrière was not a pioneer. In his public consultations and lectures, Charcot was, with the possible exception of Trousseau, the greatest teacher of clinical medicine of his time. Osler, coming later as a junior, ran him an easy second. In order to get the complex semeiology of nervous disorders into the heads of his auditors, Charcot deliberately dramatized and visualized the essential features by demonstrations on a miniature stage, with footlights, upon which he himself mimicked, in a way never before realized, the various attitudes, gaits, tremors, ties, spastic phenomena and other motor and sensory disorders of the neurotic, the typical pathological lesion in each case being thrown upon a screen after the exhibition of the patient. The various imputations to the effect that he was theatrical, that he cared more for the disease than the patient, that he neglected treatment, that he subjected hysterical patients to strenuous tests under hypnotism, were, of course, solemn nonsense, dictated by the malice of enemies, usually disgruntled colleagues whose clinics were not so largely attended. Charcot was actually regarded as "timid" by his intimates, a Gallie way of saying that he had a supersensitive nervous system concealed under a cold, impassive manner. Youthful likenesses suggest an illustration to Balzac. He looks like Napoleon at Brienne or Rastignac about to make war upon a hostile world ("*à nous deux maintenant*"). That he consciously schooled himself, by iron self-control, to be the great beneficent personality he was, reveals the real trend of his character. The bitter twist about the mouth, the sad, penetrating eyes, tell of the fierce, inner struggle for self-mastery. Charcot really loathed oratory and other theatric tricks. His private and public life, that of a Benedictine, goes to show that he was a determined enemy of banal publicity, public demonstrations and superfluous fuss and feathers of all kinds. His voice was distinct but low, his audiences the largest of any clinic in Europe, hence

he had to employ mimicry and "object teaching" to get his ideas across to his pupils. His apparent interest in the disease rather than the patient was due to his intense passion for thoroughness in investigation, was often set off by a compassionate, sympathetic manner on occasion, and that his treatment was effective, where humanly possible, was evidenced by the great armies of patients who flocked to him from the five continents of the globe, seeking relief from their sufferings. Toward the end of his life, he stressed his views on the therapeutic device of setting the mind to repair its own troubles in "*La foi qui guérit*," which sums up all that is known of psychotherapy and healing by faith.

Charcot was happily married to a lady of wealth, whose devotion extended even to assisting and forwarding his literary productions. In his beautiful home in the Boulevard St. Germain and his summer home at Neuilly, he was an entirely different person from the cold, impersonal, impassive chief of Napoleonic mien, who dominated every nook and corner of the Salpêtrière. In the bosom of his family, among his friends and beloved pupils, the natural goodness and amiability of the man asserted itself in the most charming way, even to the extent of participating in the harmless hoaxes which were seemingly put over on the grave professor. From his father, he had inherited or acquired a passionate love of art, and the upholstery, bibelots and paintings in his domicile, chosen by his wife, were famous in the Paris of those days. Charcot, indeed, created the study of medicine in the fine arts, classifying the nervous diseases depicted by the Dutch and Italian painters with the same power of arrangement and coördination which he applied to the thousands of patients in his great hospital. In spite of his intense love of home and privacy, an expression of his innate loathing of vulgarity and vain show, he usually devoted his vacation to travelling, and knew the museums and art collections of Europe better than most connoisseurs. On one of these expeditions he died suddenly, of heart failure with pulmonary œdema, in an inn by the lake of Settons (Nièvre) on August 16, 1893. Due to this insidious disease, the life of the great quietist, at home and in hospital, had been so exclusively sedentary that it was said that he never knew how to walk because he had never really learned. A pathetic detail is to the effect that this sensitive, silent man, who had never

harmed a single human being in his life, was tormented through his later years by satanic anonymous letters, predicting that he would die shortly of cerebral hæmorrhage.

It has been well said that the French do their duty by their great men, even to the extent of naming their streets after their great physicians. Yet, while there are many statues of Charcot in France, an extended biographical study, such as Vallery-Radot achieved for Pasteur, or Paul Triaire for Bretonneau and Larrey, remains to be written. The ceremonies in honor of his centenary at the Paris Academy of Medicine and the Sorbonne on May 26 and 27, 1925, were grave, moving and impressive, attended by physicians from seventeen different countries, and supported by the government. The eulogies were pronounced by his old pupils, Marie and Babinski, followed by reminiscences and appreciations by the younger generation. To read the countless tributes from all lands, following his death and during the present year, is to realize that Charcot was not only the greatest physician of France, but, in relation to his period, of the whole world.

F. H. GARRISON

THE FINANCES OF THE ACADEMY

The sale of the property at Sixtieth Street and the purchase of a less expensive site has given some of the Fellows of the Academy the impression that the financial situation of the Academy was excellent and that the Academy was very rich. Although the Academy's endowment is now far larger than was anticipated a year and a half ago, the Academy is by no means in an easy financial situation. Its income for the present year, however, and in 1926 will be larger than its expenditure, but the cost of operation of the new building will be more than double that of the present building and additional funds will be needed when the new building is occupied. The annual expenses of the Academy in its new building will be approximately \$195,000. Prior to the sale of the Sixtieth Street property, the future income of the Academy from all sources when installed in a new building was estimated at \$148,000. The profit on the sale of the Sixtieth Street property and the purchase of a less expensive site increases

the Academy's endowment by nearly \$650,000 and its income by \$32,500. The total income for 1927 should be about \$180,000.

The expenses of the Academy for the fourteen months ending December 31 1924, were \$155,523.02. The income of the Academy during this period was \$128,451.85 (plus certain balances), leaving an actual deficit of \$24,737.58.

The expense of the Committee on Medical Education and the Bureau of Clinical Information was paid chiefly from the Rockefeller fund and a small part by a donation from the Carnegie Corporation turned over to the Academy as the balance remaining to the credit of the New York Association for Medical Education.

The expenses of the Public Health Committee were \$15,849.03. This was paid largely by special donations and by income from the Rockefeller fund.

The salary of the Director and his expenses are paid from the Rockefeller fund.

The income of the Academy from dues, assessments, and endowment for the maintenance of the building and the library was \$71,665.85 during this period. The expenses not paid for out of special funds were \$107,723.35. Some of this expenditure will not recur as it consisted of legal services, taxes, etc., in connection with the purchase and sale of property.

The budget of the Academy for 1925 is \$132,496. The income should be about \$160,000. The deficit of \$24,737.58 on December 31, 1924, was paid from the income of 1925, and there may be a surplus at the end of the fiscal year, December 31, 1925.

In 1926 the budget will be somewhat greater as it may be possible to begin a new library service with a new librarian. The additional expense will be paid in part out of the Rockefeller endowment. There should be a small surplus at the end of 1926.

If, in 1927, the Academy should be in its larger building which will cost considerably more to maintain and with the new library activities, the Committee on Medical Education, the Bureau of Clinical Information, the Public Health Committee and the other educational work already agreed upon, the budget will be \$195,000. It is probable that all the activities may not be inaugurated and that the budget may not be so large. It is perfectly clear, however, that any savings made will be savings on the in-

come of the Rockefeller endowment for new educational and library activities.

Academy funds must be used for the purchase of books and journals and binding, for the present library staff, and for the maintenance and operation of the new building.

The budget following is purely provisional and has not been approved, but is a fair indication of what the expenses will be. The estimate is liberal, but expenses cannot be foreseen and the Fellows of the Academy can perhaps better realize the expense of the new project.

The Academy is the residuary legatee of the Witthaus estate and should receive in the future, a somewhat larger income than at the present time.

The Academy also has an interest in the estate of Charles A. Powers which will ultimately net the Academy several thousand dollars a year.

The Academy, in one sense, is rich, but its obligations are great. It could readily expend on the library an additional \$10,000 a year for books, completing files, classics and incunabula, and it will actually need more money for maintenance in 1927 or at latest in 1928.

THE FINANCIAL SITUATION OF THE ACADEMY

Permanent Interest-Bearing Endowment

	Principal	Interest
Library Funds	\$ 165,291.00	\$ 8,264.55
Special Funds—		
Carpenter, Gibbs, Loomis	30,952.42	1,547.62
Endowment Fund	34,552.46	1,727.62
For New Site Endowment Drive.....	384,643.41	19,232.17
General Permanent Fund	283,610.71	14,180.53
	<hr/>	<hr/>
	\$ 899,050.00	\$ 44,952.49
Balance Sale 43rd Street (after pay- ment of mortgage, \$100,000, moving expenses and equipment new building)	445,000.00	22,250.00
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	\$1,344,050.00	\$ 67,202.49

ESTIMATED INCOME OF ACADEMY, 1927

From Permanent Endowment	\$ 67,202.50
“ Witthaus Fund	7,000.00
“ Rockefeller Endowment	62,500.00
“ Dues at present rate	32,000.00
“ Assessments	12,000.00
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	\$180,702.50

Income, estimated at 5%, actually is about 5.25%.

ESTIMATED BUDGET, 1927

Operation of Building	\$ 56,240.00
Academy Administration	38,380.00
Library Administration	36,100.00
Books, Journals and Binding	25,000.00
Public Health Committee	15,000.00
Committee on Medical Education	8,000.00
Bureau of Clinical Information	10,300.00
Exhibitions	2,500.00
Traveling and Entertainment	2,000.00
Special expenses for Lectures, grants under Gibbs Fund, etc.	1,550.00
	<hr/>
	\$195,070.00
	S. M. M.

OBSERVATIONS ON THE SO-CALLED OCCULT SUGAR OF THE URINE WITH PARTICULAR REFERENCE TO THE LEVEL OF BLOOD SUGAR

L. W. GORHAM and THOMAS ORDWAY, Albany

(Delivered before the New York Academy of Medicine, Oct. 1, 1925)

Abstract

Specimens of blood were examined every two hours by the micro method of Randles and Grigg (*Journal of American Medical Association*, Vol. 82, March 1, 1924), and two hourly specimens of urine were examined for their sugar content by the Benedict-Folin Method (an adaptation of the pieric acid method of Benedict, 1921).

Curves were charted in series of cases represented in the following groups: (1) Normal Individuals, (2) Untreated Diabetics, (3) Diabetics under Insulin, (4) So-called Renal Diabetics, (5) Patients with *Staphylococcus* Skin Infections.

In the first group characteristic normal curves were determined under varying conditions. Average normal curves showed only slight variations in different normal individuals, even though the caloric intake, exercise and mental state were inconstant. In the second group curves conforming to a single type occurred, blood and urine sugar being consistently elevated—but the urine showed much greater variations than the blood sugar. In the third group the change from the diabetic curves to normal curves as induced by Insulin was shown. In the fourth group a diagnostic relation between blood and urine curves was found in the so-called Renal Diabetics. In the fifth group, which was studied on the supposition that recurrent furuncles might be associated with “peaks” of high blood sugar, usually missed when the specimen is taken with the patient fasting, the results were not conclusive.

The method of study is of value as follows: (1) It aids in the prompt recognition of mild and so-called Renal Diabetics, under normal conditions of diet, as contrasted with the dextrose test meal. (2) It permits the use of large doses of Insulin to obtain rapid desugarizing of patients, thus shortening hospital stay. (3) It furnishes an accurate idea as to dosage, the optimum time of administration and amount of Insulin necessary. (4) It permits the detection of cases of persistent hyperglycemia without glycosuria.

We have come to believe that this two-hour test has a definite value as a routine procedure in the study of carbohydrate metabolism under normal conditions of diet, etc., in a measure comparable to the concentration and fixation test as recently used by Mosenthal.

FURTHER OBSERVATIONS ON THE ASSAY OF DRUGS
OF THE DIGITALIS GROUP

ARTHUR KNUDSON and M. DRESBACH, Albany

(Delivered before the New York Academy of Medicine, Oct. 1, 1925)

Abstract

We are all agreed that it is necessary to have preparations of uniform strength to insure accurate use of these drugs in medicine and numerous attempts have been made to assay the strength of digitalis preparations. Most of the methods used for assay have been biological ones and the two methods which are at present in extensive use are the lethal dose method on frogs, with injections into the lymph sac, or the lethal dose method on the cat with slow intravenous injection. The advantages claimed for the latter are that it can be carried out at any time of the year without the complications introduced by the necessity of controlling the sensitiveness of the animal, that by intravenous injection the drug is completely absorbed, and that the effects on the human heart may be expected to be more akin to those on the cat than to those on the frog. The majority of the chemical methods which have been developed for digitalis assay have been based on separating and estimating the amount of one of the active "principles," particularly digitoxin. All such attempts have proven disappointing, as the active principles are very imperfectly known, and even the best established of them—digitoxin—cannot be assayed chemically with any approach to accuracy. These so-called active principles, moreover, differ considerably in their physiological activity and a determination of the amount of any one of them would not be an index of the potency of the preparation.

Recently a new chemical method was proposed by Dr. Dresbach and myself.¹ It is based on the coloration produced in the decolorized tincture by picric acid and alkali. This reaction was first pointed out by Baljet,² who had shown that bodies having a

¹ Knudson and Dresbach: Jour. of Pharm. and Exp. Therap., 1922, XX, 205. Jour. Amer. Pharm. Assoc., 1923, XII, 390.

² Baljet: Schweiz Apoth. Ztg., 1918, LVI, 71 and 84.

typical digitalis action gave an orange red color with dilute alkaline picrate solution. The color reaction in the case of digitalis preparations does not measure the amount of glucoside but the physiological activity of the preparation, which seems improbable, but is supported by a large number of observations on which the results of the chemical assay are compared with those of assays by the cat method of Hatcher and Brody.³ We have applied the method to tinctures, fluid extracts, infusions, purified preparations of digitalis and also to some of the active "principles," and the agreement between the chemical and bioassay cat method is well within the limits of accuracy of any biological assay.

Biehler and Rist⁴ have recently reported the assay of several digitalis preparations by the colorimetric method, one-hour frog method (Gottlieb), and twenty-four-hour frog method. They observed a good agreement between the colorimetric and one-hour frog method. They criticize the chemical method, however, because they claim that the color reaction does not run exactly proportional to the amount of material present when testing it on a pure preparation such as strophanthin and digitoxin. They also state that digitonin (which by itself does not react with the color reagent) intensifies the reaction of digitoxin with the reagent. Both of these points are not in agreement with our observations. In developing our colorimetric method one of the first observations made was to determine whether the color was proportioned to the amount of pure principle present and we have always found it to be the case. Of course, it must be remembered in comparing the color of any two solutions the unknown must not be more than 25 or 30 per cent. above or below the standard to get good comparative readings. We do not find that digitonin in any way intensifies the color reaction of digitalis bodies having an action on the heart.

Although the chemical method is still in an experimental state and further work is needed to confirm our results and to establish the value of the method, we believe that it has several distinct advantages over the biological assays which at present are

³ Hatcher and Brody: *Am. Jour. Pharm.*, 1910, LXXXII, 360.

⁴ Biehler and Rist: *Arch. Exp. Path. and Pharm.*, 1924, Ci, 139.

the only accepted ones. The method is relatively simple, inexpensive, less time is required for test than most of the biological assay, and the color reaction is a very sensitive one. If a definite weight of one of the active principles in digitalis, such as digitoxin, were adopted as a unit of activity, the chemical method could be used to test the activity of any digitalis preparations in terms of this unit and insure more uniform preparations on the market.

EXPERIMENTAL EVIDENCE CONCERNING THE SITE OF ACTION OF DIGITALIS AND STROPHANTHUS PRINCIPLES WITH SPECIAL REFERENCE TO STROPHANTHIDIN

M. DRESBACH

(Delivered before the New York Academy of Medicine, Oct. 1, 1925)

Abstract

Although the emetic action of digitalis and allied substances is of secondary importance, additional knowledge regarding the origin of the nausea and vomiting induced by these bodies is desirable because of the close temporal relation of their therapeutic and emetic actions. Whether or not there is a direct connection between the two sorts of effects is a point which may be said to be still undecided. In the opinion of Hatcher and Weiss,* the emetic action is a reflex induced in the heart.

We have sought to obtain evidence on this point, using cats as our experimental animals, and employing strophanthidin and certain purified digitalis bodies and preparations as the emetics. Strophanthidin, which is a hydrolytic cleavage product of certain strophanthins, lends itself conveniently to a study of this question because of its rapid elimination, or destruction, in the animal body and because it produces all of the typical cardiac effects of digitalis and strophanthus principles. Our plan of procedure was in general similar to that of Hatcher and Weiss in that we compared the effects in animals with the hearts denervated with those in intact animals. We have found that emesis, which is easily produced by strophanthidin in normal

* Journ. Pharm. and Exp. Therap., 1923, XXII, 139.

animals, is not prevented by complete denervation of the heart in the cat, if the animal has been given sufficient time to make a good recovery from the operations necessary to disconnect the heart completely from the central nervous system.

In addition to strophanthidin, we have used ouabain, amorphous strophanthin, digitoxin, and, in a few cases, tinctures and fluid extracts of digitalis, and, so far as we have gone, we have had no animal with complete denervation of the heart in which we could not produce emesis by injection of the preparations mentioned.

Our results, of numerous experiments, lead us to conclude that digitalis and strophanthus principles do not induce nausea and vomiting in experimental animals reflexly by action on some structure in the heart, or, at least, not entirely in that manner. The action is more probably due to an effect in the medulla, because the complete denervation of the heart by section of its extrinsic nerves, section of the cord at the level of the seventh vertebra, decerebration and removal of the cerebellum (Hatcher & Weiss) do not prevent it.

SOME MEDICAL BEARINGS OF ECCENTRIC MOTOR ACTIVITY

GEORGE S. AMSDEN, Albany

(Delivered before the New York Academy of Medicine, Oct. 1, 1925)

There is scarcely any need to emphasize here the rather well-worn truism that the guiding principle behind all animal and vegetable structure is utilitarian. The human body is no exception. It is designed with the practical aim of doing something—and that something is fundamentally that which contributes to its sustenance or continuance. Nature is rarely sentimental or dreamy. It is definitely pragmatic. Its purposes in the human body, with little exception, involve movement. It may be simple movement as that necessary in food-getting or in aggression or defense. It may be less direct as in talking or in scientific research. So thoroughly is the body committed to this plan that almost every stimulus which strikes the body passes over fatalistically into movement or its equivalent. It is almost as inevitable

as the passage of a current over a circuit when that circuit is completed.

The prevalent lay, and non-medical, conceptions of the central nervous system as initiating motor activity must suffer some modification. It is fairly clear that the central nervous system initiates much less than is commonly supposed. Just how much it is restricted in this way it is yet somewhat hazardous to say. It is difficult to think clearly about this because of lack of full information and because the terms in which we think of it are so committed to the conception under examination. We are at least clear that very much of the activity ascribed as originating in the central nervous system does not arise there. It seems reasonably plain that much of our motor activity arises primarily through the excitement of an instinct, or of a nucleus of instinct overlaid by habits or overlaid by reaction patterns less crystallized than habit. In this conception the central nervous system acts largely automatically, and is the passive distributing agent of disturbances arising outside it. We know too little yet to make it safe to exact a very close analysis, according to this conception, of specific instances, but enough is known, not only to enlist our interest, but to give us an apparent better insight into certain medical problems.

This conception would seem to suggest that automatically, on the occasion of a stimulus, there is mobilized a general motor disposition, and that, perhaps guided at first by instinct and later by the added results of experience, this somewhat generalized motor disposition is distributed into special channels so that the resulting motor activity is specialized. Of just what this motor disposition consists and how it arises we do not know. Physiological research, especially that of Cannon and others, suggests strongly an endocrine origin of it. Of this, however, we must admit that we are largely ignorant. At present it seems sufficient to recognize this probable general mode of initiating motor activity as distinguished from the more formal neural conception current essentially up to the present time.

This conception, if valid, has rather extensive and important application. Within the range of normal physiological variation we may speak of the more active and dynamic individuals as those who mobilize readily this disposition to motor activity,

while the less dynamic or hypo-dynamic individuals stand toward the other end of the scale and mobilize much less readily. Within narrow limits we recognize in ourselves variation in this capacity for summoning energy. Eliminating those times when we may by fatigue account for our tendency to inactivity, and, again, eliminating those other times when we get rested and feel energetic, we all of us experience variations in ourselves so that we, now, feel energetic and, again, indisposed to action. It would appear that the mechanism upon which this mobilization depends varies in us from time to time. In some of us the swing of variation is rather great and we see the same individual, now, rather overactive and, again, rather underactive. This swing reaches its maximum in those who become hyperactive and excited, or hypoactive, or depressed. The manic-depressive psychoses display these extremes of mobilization. The individual may be hyperactive with his muscles, overactive, also, emotionally and mentally. On the other hand, the depressed phase of this disorder displays a marked reduction of muscular activity so that the individual appears quite inadequate. He is, then, reduced in mood, so that he is depressed, and, also, his mental activity is slowed down. These extreme swings are, so to speak, massive. The whole individual responds consistently in one direction or the other.

These massive swings of the motor inclination constitute perhaps the simplest and most readily understood of the psychotic states and for this reason it may be found expedient to start formal didactic instruction in psychiatry with discussion of the manic-depressive psychoses. We have the germ of them within ourselves. Those expressions of a tendency to action, which, for one reason or another, are not massive in this way and do not sweep the individual consistently to an extreme of activity, but are more local, or restricted, are much more puzzling. They are very apt to be associated with conflicting desires, and the more commonly recurrent ones we are prone to characterize and identify, not by the motor tendency, but by the associated feeling, or by the practical bearing of this feeling in the field of our interest. In this way the attention is shifted from the origin of the experience, the motor reaction, to the feeling of this reaction and its general bearing on our interests. The difficulty in the matter of

understanding them is seen, therefore, not so much to be an intrinsic one as it is one in which we are obliged to think in unwonted terms. A brief reference to the nature of the will may illustrate this. We are inclined to speak of the will as an independent function which in some way, initiated outside the machine, gives force or persistence to this tendency of the body to do things. Whereas it seems highly probable that orderly training, arising either by chance or design, together with other qualifications, brings about such a facilitation of the natural inclination for stimulus to pass promptly over into special movement that the individual concerned is observed to act with especial decision and force. A person in whom this is habitual and efficiently operative may be said to be a person of strong will. It would appear that he has especially utilized and harnessed for this purpose a natural tendency rather than that he is possessed of a special quality or capacity which, operative in some independent way, impresses itself and compels obedience. Many of the so-called functions of the mind may similarly be seen to be ingenuous abstractions or generalizations of complications of this simple principle of motor activity. I fancy much of the obscurity which hovers about matters mental, both normal and pathological, may be traced to a failure to refrain from generalizations of this sort, which immediately we are prone to set up as functions independent and dominating.

This tendency to assume something of the nature of an entity is quite seductive. In a less circumscribed and definite way we fall into temptation in our commonsense attitude toward such matters as fright, apprehension, worry and the like. These manifestations we tend, in our thinking and, also, in our practical course of action, to regard as largely mental in origin and, consequently, to be controlled by a sort of mental discipline which we anticipate bringing about by dealing logically with the topic which is chiefly concerned. For instance, if a patient is apprehensive about something which, to the outsider, *obviously does* not warrant it, the natural inclination is to try to explain impressively the inconsistency. Usually the patient welcomes the attention bestowed in this way, but is very little impressed or is only transiently influenced by it. The apprehension persists in spite of the logical analysis of its needlessness. Our expecta-

tions are misled by our inclination to accept the mental as the fundamental, primary, or leading factor in the production of the apprehension. Usually it may be demonstrated that the apprehension is a state in which a motor tendency is in the lead. Very frequently it is found that the feeling of apprehension is closely connected with a general, perhaps instinctive, tendency to do something about an interest when there is no appropriate act to be carried out. The apprehension appears to be an experience in which a tendency to constructive activity is frustrated. Apprehensiveness would appear to be closely related to the actual feeling of the motor and other organs ready and bursting for action when the actual culminating act does not, for one reason or another, take place. It is a commonplace experience that motor activity in a state of great emotional tension gives at least some relief, even if the activity is not entirely appropriate. In states of fright Cannon has made extensive studies which, in the main, illustrate the validity of this general conception.

What appears to be true in the case, for instance, of apprehension seems, also, to be true in all the dominating emotions as fright, worry, joy, sorrow, and the like. These emotional states become intense somewhat in proportion to the instinctive urgency at their origin and, also, in proportion to the degrees of failure to secure an appropriate outlet or motor assertion of this urgency. A little experience in handling emotional states with this conception as a guide is instructive and more convincing than any amount of discussion or description of it. A great deal of difficulty in handling these states lies in the persistent tendency of the patient to weave about his emotional interests a fabric of interpretation which is misleading both to the patient and to the physician. The patient tends to read reasons and explanations into his state, which are apt, by his relatives and others, to be taken seriously and lead him to seek very inappropriate sources of assistance. The aberrant health cults thrive on this tendency. It may be of interest to refer here to the so-called subconscious mental and emotional activity. Whether or not it suits our scientific palate to contemplate tolerantly the existence of the subconscious, there is certainly a somewhat orderly activity of the nature of coördination and adjustment which, so to speak, works while we sleep. If such an activity may be assumed, it

would seem not improbable that an important field of its activity lies in the sphere of striving for motor adjustment in the face of instinctively felt needs—a striving which attains results often quite surprising.

While there are these and numerous other details of importance to the neurologist and psychiatrist linked up with this conception of the rôle of motor activity, there are not lacking practical issues of importance to the surgeon and internist. So-called headache, pain in the frontal region, pain in the back of the neck, pain in the back, and, less often, pain or discomfort in the extremities, some obscure respiratory troubles, sphincter spasms, and perhaps many other complaints which come to the general practitioner and specialist, and are not benefitted by treatment, should be examined with reference to some miscarriage or motor activity. Usually what is found is this: the patient under the stress of some disharmony or frustration of desire automatically persists in maintaining a local muscular tension. It is as if the disharmony or frustration of desire could not be accepted and as if it were imperative that some effort be made, even though it be inappropriate and ineffectual. The mere expenditure of effort automatically appears to afford a vicarious satisfaction. We knit our brows over an abstract problem. As spectators at a football game we assist our favorite player by effort of our own muscles. In anxious and distressed states tension of the muscles of the brow, of the extrinsic eye muscles and muscles of expression, or of the back of the neck, persisted in at length produces a fatigue which is often painful, or serves as an object of anxious attention and so becomes essentially painful and gives rise to many of the so-called neurotic complaints.

As an illustration of an important bearing of this general principle for the general practitioner I might cite a sample case of which a considerable number have come to my attention. He belongs to the group of hypertension cases in which there is little or no demonstrable organic lesion.

He is a business man of 55. There is nothing of especial significance in the family history, nor in the personal history, up to the age of 40, when he had whooping cough severely. At 45 he had some labyrinth trouble in one ear. By way of encouragement he was told at the time that he might have apoplexy some

time. He kept this suggestion in mind, though it did not interfere with his work, his relations at home, nor much with his own enjoyment. This did, however, stand in the offing as an uncomfortable anticipation. It should have been stated that he is, by temperament, very pushing and hard working, and often returned to his office to work in the evening.

The present illness began insidiously some two or three months before. He first felt a little "logy and dead." Then he felt, one day, a little faint and dizzy at his desk. He was badly constipated and was suffering, also, from the excessive heat of the summer. He felt light headed for about an hour and had a residual occipital headache. He became apprehensive lest his scheduled attack of apoplexy be due. Subsequently, he had several similar, but less severe, attacks. There was no palpitation, no dyspnoea on exertion. Recently he had become so apprehensive that he was unable to sleep and was unwilling to leave the house lest he have some calamity befall him.

When seen in consultation he was tense, spoke rather volubly about his discomfort; was restless, gestured rather emphatically, and was so anxious about himself he could not read the papers, or, at most, only scan the headlines.

The physical examination was negative, except that he had a blood pressure of 175/50. The laboratory reports were all negative, except that on one or two occasions an occasional cast was found in the urine.

Here is a case which will clear up in a few weeks if you can get him to keep quiet, relax, and rest. Unfortunately, a good many of these cases are indisposed to lend themselves to a quiet régime. They are apt to be very bustling, active, pushing individuals who ordinarily work hard and whose illness is often ascribed to overwork. It is quite useless to advise them to "use their will power" and to reassure them they will get well. Their statements that they are frightened and apprehensive are based upon feelings which are actually present in them and they are ascribing to these feelings the same significance you and I would, if we had them. But you and I have these feelings only when there is some external provocation for them. It is their disorder that they have them without external provocation. These feelings are usually, on study, found to be associated with the ex-

perience of muscular tension, with a mobilization of a motor disposition which, having no proper external application, expends itself in ineffectual tension of muscles, including the smooth muscles, and give rise to dominating emotions of varying sort. The patient is like a jumpy government which calls out 10,000 militia when 500 would be enough. He over-mobilizes and the excess of energy finds an outlet by throwing into operation those physiological mechanisms which get into action usually only when we are, for instance, actually, for good reasons, apprehensive. He has the feelings appropriate to apprehension, and, argue logically as long as you please, it will not influence him much. He, so to speak, has the goods. After you have studied him and know what his problem is, you can usually teach him how to manage without so much mobilization, and so teach him how to avoid the stampeding effect of a blind muscular tenseness.

In the case of the patient I cited this was done. In a couple of weeks he was sleeping well and in some six weeks he returned to work. His blood pressure had returned to normal and he enjoyed an average feeling of wellbeing.

This origin of numerous so-called nervous, as well as some apparently somatic, complaints in eccentric motor activity appears to my observation to be largely overlooked. As a result patients seek one physician after another, or get passed along by the physician from one specialist to another, and from one to another operation, and finally find relief, if they get it at all, in some measure, from which they get a knack of relaxation. This habit of displaced muscle tension is a commonplace observation in psychiatric practice. Unfortunately, by the time the patient gets to the psychiatrist the habits of tension have become so embalmed, as I have tried to represent, in a mass of habitual and unfortunate reasoning in attempts to understand and account for the discomfort that the psychiatrist's path is a difficult one. His problem is, in part, that of re-educating the patient out of these habits and often it cannot be done. The stage of another sort of metastasis has begun. Personally I am more or less continuously in a state of desire to plead with the general practitioner for a little more tolerance and for the cultivation of a vision a little broader so that he may take this neglected factor of bad motor habit into account in his diagnosis and treatment.

CERTAIN CLINICAL AND EXPERIMENTAL ASPECTS OF ECTOPIC ENDOMETRIOSIS

V. C. JACOBSON, Albany

(Delivered before the New York Academy of Medicine, Oct. 1, 1925)

(ABSTRACT)

The characteristic clinical picture of implantation endometriosis is presented, otherwise known as Sampson's syndrome.

In a series of nineteen rabbits the intraperitoneal autotransplantation of endometrium during oestrus was successful in sixteen, or 84 per cent. In six rabbits so treated during the resting stage there was one positive result. In six rabbits operated on during pregnancy there were implantations in two, or 33 per cent. An increased vitality or "virulence" may be assumed for endometrial tissue during oestrus. This is in accord with Sampson's menstrual theory of origin of most human endometriosis. Implantation usually occurs upon pelvic structures, and in a few instances it has been observed upon the colon and urinary bladder. The implants are invariably cystic adenomatoid structures, often multilocular. There is no evidence in these experiments in favor of the view that endometrial tissue can be formed by metaplasia of mesothelium.

DR. ARCHIBALD MALLOCH APPOINTED LIBRARIAN

At a special meeting of the Council held on September 16, 1925, Dr. Archibald Malloch, of Montreal, was appointed Librarian of The New York Academy of Medicine.

A special committee, consisting of the Library Committee, the Chairman of the Board of Trustees and the Director have been searching for a librarian for nearly two years. A large number of possible candidates have been considered including university and college librarians and those engaged in special library work, as well as physicians interested in library and literary work. The advice of the Director of the New York State and City Public Libraries was obtained as well as that of the officers of the

Library Association and institutions interested in the maintenance of libraries. In brief, the entire question has been carefully studied and the field of possible candidates carefully searched.

Dr. Malloch is a graduate of Queens University. He received his medical degree from McGill, and is a member of the Royal College of Physicians. His early work was at McGill where he served as resident pathologist and bacteriologist and as interne in medicine. He served with the Canadian Red Cross and Canadian Army Medical Corps during the war and was subsequently Beit Fellow at Oxford. He resigns his positions as Demonstrator in Medicine at McGill, Assistant Physician at the Royal Victoria Hospital, and Assistant Editor of the *Canadian Medical Association Journal* to accept the position of Librarian at the Academy.

Perhaps largely due to Sir William Osler's influence, Dr. Malloch became deeply interested in library work and historical medicine and he and Dr. W. W. Francis were selected by Sir William to prepare a catalogue raisonné of the eight thousand volumes of classics, pamphlets and incunabula in the Osler collection. This work has been completed recently.

Dr. Malloch has frequently contributed to the medical journals and has written several articles on historical subjects in medicine.

The new Librarian will bring to the library a trained medical mind familiar with medical literature and an enthusiasm for the occupation of his choice. In undertaking his new duties on January 1, 1926, Dr. Malloch has the best wishes of the Council.

MEDICAL INCUNABULA IN THE LIBRARY OF THE NEW YORK ACADEMY OF MEDICINE

Albertus Magnus. De animalibus. Finit feliciter opus . . . et impressum Mantue per Paulum Joan de Butschbach . . . sub anno dni millesimo quadringentessimo septuagesimonono, die vero duodecima Januarii.

Sig. A 2- Z & A- Z 5. fol. [1479.]

Albertus Magnus. Phisico., siue De phisico auditu libri octo.

[Venetiis: per J. de Forliuio e Gregorium frat. 1494]
124 l. fol.

Albertus Magnus. Di virtutibus herbarum. De virtutibus lapidum. De virtutibus animalium. De mirabilibus mundi. Paruum regimen sanitatis valde utile.

[Cologne: Corn. of Zierikzee, 1499?] 24 l. sm. 4°.

Argelate, Petrus de. Chirurgia magistri Petri de largelata.

[Ventiis, Bonetus Locatellus, 1497,] 131 ff. fol.

Arnoldus de Villa Nova. Practica medicine Arnaldi de Villa noua.

Venetiis: per Magistrum Otinu papiensem de la luna, 1497, 67 l. fol.

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[Lipsiae: M. Herbipolensi, 149-?] 143 l. 8°.

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Venetiis: P. Mauser & soc. 1486. var. p. 4°.

Avienus, Rufus Festus. Opera. Fragmentum Arati phaenomenon . . . Quinti Sereni medicinae liber.

[Venetiis: A. de Strata, 1488.] 118 l. sm. 4°.

Bagellardus, Paulus, a flumine. Libellus de egritudinibus infantum.

[s. l. 1472.] 40 ff. sm. 4°.

von Bayrlandt, Ortolff. [Arzneipuch.]

Nurenberg: A. Koburger, 1477. 4 l. 2-28 ff. f°. Imperfect.

Brunschwig, Hieronymus. Liber de arte distillandi de simplicibus.

Strassburg: J. Grueninger, 1500. 2 l., ccix f., 3 l. fol.

Comestor, Petrus. Historia scolastica.

Argentino: J. de Gruningen & H. de Ingulier, 1483. 45 l. 253 ff. fol.

Diogenes Laertius. Vitae et sententiae philosophorum.

[Venetiis: N. Jenson, 1475.] 186 l. sm. 4°. Damaged copy.

Falcutius (or Faleucci), Nicolaus (Florentinus). Sermo tertius de membris capitis.

[Venetiis: per Mag. Bernhardinum de Tridio de Moteserrato, 1490] 177 ff. fol.

aggregavit eximius artium et medicine doctor Mattheus Silvaticus ad serenissimum Sicilie regem Robertum.

Venetiis: 1480, 233 l. fol.

de Tusignano, Piero. *Recepta Petri de Tusignano supra nono Almansoris.*

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In: Ketham, Joannes. *Fasciculus medicinae.* . . .

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London. J. & A. Churchill. 1925. 344 p.

in 1890; elected a Fellow of the Academy May 2, 1918. Dr. Heyman was the superintendent of the Manhattan State Hospital for the Insane, a Fellow of the American Medical Association, a member of the American Psychiatric Association, and a member of the Neurological Society.

FRANCKE HUNTINGDON BOSWORTH, A.B., A.M., M.D., 1 West 54th Street, New York City; born in Marietta, Ohio, January 25, 1843; graduated in Medicine from Bellevue Hospital Medical College, New York City, in 1868; elected a Fellow of the Academy January 8, 1880; died at his home in New York City, October 17, 1925.

The death of Dr. Bosworth marks the passing of the last but one of that generation of great contributors to medical science who established the department of laryngology in the United States. As a pioneer his work, with that of Dr. J. Solis Cohen, of Philadelphia, who is still living, will stand preëminent for all times. To the late Dr. Horace Green, of New York, was given the title "The Father of Laryngology"; to Dr. Gurdon Buck that of "The Father of Intra-laryngeal Surgery," so to Dr. Bosworth belongs the well merited title of "Father of Rhinology." Through his genius and through the inspiration of his teachings the importance of the anatomy and the pathology of the nasal region was brought to the attention of the world. The advances made in the knowledge of rhinology during the past forty years have been largely due to his brilliant initiative. The event of his death comes as the present number of the BULLETIN goes to press. An extended notice will be given in a later issue.

D. B. D.

DONATIONS TO THE LIBRARY FUNDS

Donations and bequests are solicited by The New York Academy of Medicine for the maintenance and expansion of the Library.

A donation or bequest of \$5,000 or more will provide for a special library fund, the income of which may be used for the general purposes of the Library or restricted to the purchase of books and periodicals, as the donor or testator may indicate.

When so restricted, a special bookplate will be used. A donation or bequest of less than \$5,000 but more than \$1,000 will provide for a named library fund, the income of which will be used for general library purposes or restricted for the purchase of books and periodicals, as desired by the donor or testator.

Donations of less than \$1,000 will be added to the general library funds.

FORM OF BEQUESTS

The following is a brief legal form as a suggestion under which bequests may be made in behalf of the Academy:

I give, devise and bequeath unto "The New York Academy of Medicine" of the City of New York, State of New York, a corporation duly incorporated by the Legislature of the State of New York by an act, entitled "An act to incorporate The New York Academy of Medicine," passed June 23, 1851, and amended June 4, 1853, and June 2, 1877

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Trustees, 2nd Wednesday.

Council, 4th Wednesday.

Committee on Library, 2nd Tuesday.

Committee on Admission, 1st Wednesday.

Public Health Committee, Mondays.

Committee on Medical Education, 3rd Wednesday.

Building Committee, 1st and 3rd Tuesdays.

Publication Committee, date varies.

Program Committee, date varies.

DATES OF SECTION MEETINGS

Dermatology and Syphilis, 1st Tuesday.

Surgery, 1st Friday.

Neurology and Psychiatry, 2nd Tuesday.

Pediatrics, 2nd Thursday.

Otology, 2nd Friday.

Ophthalmology, 3rd Monday.

Medicine, 3rd Tuesday.

Genito Urinary Surgery, 3rd Wednesday.

Orthopedic Surgery, 3rd Friday.

Obstetrics and Gynecology, 4th Tuesday.

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BULLETIN
OF
THE NEW YORK
ACADEMY OF MEDICINE

INSTITUTED 1847
SECOND SERIES, VOL. 1, No. 8

OCTOBER, 1925



PUBLISHED MONTHLY BY
THE NEW YORK ACADEMY OF MEDICINE
LANCASTER, PA. NEW YORK
Lime & Green Sts. 17 W. 43d St.

1925

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Entered as second-class matter, April 6, 1925, at the postoffice at Lancaster, Pa., under the Act of August 24, 1912.

Subscription \$2.00 per year. Single copies, 25 cents.



ALONZO CLARK

THE NEW YORK ACADEMY OF MEDICINE

VOL. I

OCTOBER, 1925

No. 8

ALONZO CLARK

Some years ago, as a guest of a well known consultant practitioner of New York State, I heard much of Alonzo Clark. He was evidently a highly skilled physician, an alluring teacher, a man of parts, and a personality. One anecdote, which my friend related, seemed to give the sense and inwardness of the man. As a medical student, Clark had paid some addresses to a charming young woman, of whom, apparently, he was much enamoured, but he was merely any given young man, with no money and uncertain prospects, and the parent would have none of him, while the girl apparently remained passive and submissive. Years after, when Clark had arrived in his profession, he was approached by the father with the intimation that he would now be highly acceptable as a son-in-law. The reply was: "Alonzo Clark, the student, couldn't: Alonzo Clark, the physician, wouldn't." The anecdote, if authentic, is also told of David Garrick, with some variants. What is essential is its implication. Alonzo Clark was actually that kind of a man, a man of the utmost simplicity and lack of pretence, and by the same token, totally devoid of vulgarity. Whatever the details of the story, he wore on his little finger a diamond ring, symbol of some romantic episode of the past. These were, indeed, early days—the "Age of Innocence" in American life. In France, the arrangement of marriage settlements by parents was an established social convention, part of the essential fabric of the state. Clark's line was not that of rough John Hunter's advice to Jenner: "Let her go and never mind her." He had the finesse to see the newer trend toward a commercial or "meal-ticket"

transaction, a trait of savage tribes, as described by Elsie Parsons in "Fear and Conventionality." Through this simple perception, Clark appears to have risen into an ampler atmosphere; to have acquired the humanistic or Hippocratic viewpoint attained only by the greatest physicians, namely to see all human beings henceforth as if they were his patients. The devoted Charcot, the greatest physician of his time, had this attitude beyond question. In continental Europe, in fact, it was enforced upon the student's attention by the administration of the Hippocratic Oath. Osler attained to it with the utmost geniality. Clark is vaguely remembered to-day by a device of therapy which is a vanishing fraction—the exhibition of opium in peritonitis. He was really a great bedside doctor and teacher, of the type of Samuel West or Lewis Smith.

By all accounts, he was a tall well set-up New Englander, of striking appearance and athletic physique, with a Greek profile, crowned by unruly iron-gray hair, a man who concealed his strength by a subdued manner. His office sign was a modest, weather-beaten affair, with the faded inscription "Dr. A. Clark." He never used a carriage, and once apologized to a patient for having used one, instead of taking his customary end-seat in a street-car. Yet, in no sense a *vieux bonze* or an old shoe, but a man of lively wit and gentle raillery, the logical opposite of Jacobi's "notoriety-loving physician." Eulogists speak of him as the Archiater of New York in his day, looked up to as the living embodiment of the finest professional ideals, one, however, who never blathered in public about "our noble profession." His teaching was conveyed, not by grandiloquent oratory, but in a simple, low-toned, compelling manner, set off by gentle irony. He described a hubbub in the wards of Bellevue as "a case of professional pride, two coachmen quarelling over their ability to drive," and ever stressed the fact that there are limitations to the art of medicine. Here are a few of his clinical aphorisms:

“The medical errors of one century constitute the popular faith of the next.”

“Every man’s disease is his personal property.”

“You may know the intractability of a disease by its long list of remedies.”

“Symptoms which cannot be readily marshalled into line must be credited to the nerves.”

“There is no courtesy in science.”

He was born in the village of Chester, Vermont, on March 1, 1807, and got his education at local schools and academies, taking his bachelor’s degree at Williams College in 1828. His father, a leather merchant, offered him \$1,000 to complete his education, and it is characteristic that he declined it, preferring to work his way into medicine by teaching school. He took his M.D. at the College of Physicians and Surgeons (New York) in 1835, and after the usual visits to London and Paris, devoted his leisure to pathology in the wards and dead-house of Bellevue Hospital. Here, with Camman and Mitchell, he verified the principles of percussion by experiments on the dead body, one of his most important papers (1840). He managed an epidemic of typhus fever by removing the window sashes and by strict cleanliness in the wards, saving his 250 patients in this way. His line of treatment in peritonitis, the substitution of large doses of opium for blood-letting and mercurials (1855), gave him local and temporal fame. Meanwhile he had taught *materia medica* at the Berkshire Medical Institution (1843–54), practice of medicine at Woodstock (Vermont) and physiology and pathology at the College of Physicians and Surgeons (1848–55), where he was to hold the chair of practice for thirty years (1855–85), serving, at the same time, as its dean and president during 1875–85. At the age of 78, he firmly declined to hold this office further. He was visiting physician at Bellevue, president of the New York State Medical Society, and the recipient of honorary degrees from Dartmouth (1844) and the University of Vermont (1853). While in his last illness, he did not leave his house during the six months preceding his death on September 13, 1887. The warning came in an attack of vertigo during a lecture. He sank into a chair, with the droll remark: “For many years I have held this chair, and never until this moment occupied it literally.”

Beyond the few papers mentioned, the tall Vermonter wrote but little, but like Balzac, was the horror of publishers in his endless revisions of proofs. "Precision," says one of his eulogists, "was his bane and his antidote." Beyond a scrap of paper conveying a few notes or statistics, his lectures were all delivered extempore, and he was too modest and self-critical to yield to the usual temptation of the time, the composition of a text-book on practice. His chief pleasure was to talk to medical students. His skill in diagnosis and his knowledge of pathological processes were regarded as unequalled in his time and place. And "this eminence," Dr. Elsworth Eliot says, "was not attained by sham or display, nor by the influence of social or religious organizations, nor through wealthy and powerful friends and relatives. Dr. Clark was plain and simple in all his ways: walked about the city or rode in its public conveyances like a man in humble circumstances, but impressed all who saw him with a sense of power and goodness. His professional brethren knew that he understood disease and that, with him to help them, they would receive the utmost possible aid in the management of their difficult cases."

F. H. GARRISON

THE FUNCTIONS OF THE ACADEMY

The New York Academy of Medicine was founded in 1843 for the purpose of promoting the science and art of medicine, the maintenance of a public medical library and the promotion of public health. The policy of the Academy in carrying out these functions has been guided by the Council and the Board of Trustees and by the members themselves who have voiced their opinions or adopted specific resolutions at the Stated Meetings of the Academy.

To promote the science and art of medicine, there should be frequent meetings of physicians at which may be a free exchange of opinions. In the Academy, this is accomplished by the Stated Meetings and also by the monthly meetings of twelve different groups of Fellows organized into Sections devoted to the various branches of medical and surgical science and to medical history. At these meetings, papers on medical subjects are read and dis-

cussed, patients are presented, and new instruments and specimens removed at operation or autopsy are shown. These meetings which are also open to all physicians and medical students, who do not take part in the discussion unless especially invited, stimulate the interest of the Fellows of the Academy and other physicians and are of great value in aiding the medical profession to keep abreast of the developments in medicine. Physicians prominent in special branches of the profession are invited frequently from out of town to lecture and read papers on special topics. These lectures are of value as they bring to New York the most advanced ideas of medical men and scientists from other parts of the country and from abroad.

The Council of the Academy is studying methods which might be employed to increase the value of these meetings for the Fellows and for the medical profession in the city, and this subject is in charge of a special Program Committee consisting of the three vice-presidents.

The Library, since it was founded seventy-eight years ago, has been one of the chief functions of the Academy. It is the only public medical library in the city of New York, and with its collection of one hundred and forty thousand books, fills a most useful need. It is open daily to the public as well as to the Fellows of the Academy, and especial efforts are made to attract the busy practitioner and to stimulate the undergraduate and post-graduate medical student to consult the books. The cultural aspects of medicine have not been neglected and frequent talks on medical history and its significance upon the bibliographic aspects of medicine have been initiated.

Practically everything published of real medical value in book, pamphlet or journal form is available for the Fellows and the public. The Library has a small collection of medical classics and incunabula and the beginnings of a collection of portraits and portrait engravings of medical men.

Many of the Fellows of the Academy have taken a serious interest in the community aspects of medicine, in the prevention of epidemics, of communicable diseases, of industrial accidents and diseases, and in the improvement of the medical and social factors necessary for the maintenance of the public health.

Papers read before the Academy have frequently been on subjects related to public health and during the history of the Academy, special committees have been appointed from time to time to consider hospital needs, health department activities and other allied subjects. In 1908 many of the Fellows took such a deep interest in these matters that at their request the Council authorized the organization of a section on Public Health. This section was maintained until 1912, when it was abandoned due to the increased activity of a permanent committee of the Academy created for the purpose of considering these same topics. The city administration took a marked interest in the hospital situation in 1908, and a special committee of the Academy on hospitals was appointed and a similar committee on city budget. These two committees became very active, and as their work was so similar, they were consolidated in 1911 and became the Committee on Public Health, Hospitals and Budget. The interest which had been given to the section on Public Health, was transferred to this active committee. In 1915, the name of this committee was changed to the Committee on Public Health, but its functions were not changed. The Public Health Committee interests itself in the various phases of community health and has made important studies of quarantine, communicable diseases, hospitals, dispensaries, day nurseries, convalescent homes, care of chronic patients and many other community activities too numerous to mention. The Council of the Academy has felt that this committee should not concern itself actively with controversial problems, but should only render advice to the various city departments and private agencies which might be affected by the studies or reports of the Committee.

Until January, 1924, the Academy's activities were practically limited to these three main divisions. For several years members of the Council felt that the Academy was not fulfilling its complete function in promoting the science and art of medicine, that in order to carry out its function better the activities of the Academy should be expanded, chiefly in the development of the library's activities and by the creation of a permanent committee on medical education. A series of conferences with representatives of the Carnegie Corporation and the Rockefeller Foundation

produced a lively interest in these two philanthropic institutions in the possibility of expanding the educational value of the Academy. The increasing over-crowding of the library as well as the need of larger space for the Academy's functions, was so keenly appreciated by the Carnegie Corporation that it agreed to make a considerable contribution for a new building. When plans were finally matured for the new building, the Carnegie Corporation appropriated \$1,550,000 for its construction. The officers of the Rockefeller Foundation were so deeply impressed with the possibilities of the Academy developing the educational opportunities of the city, that the Foundation agreed to provide an endowment of \$1,250,000 for certain new activities. In brief, these include the appointment of a full-time Director of the Academy's work, the appointment of a new Executive Librarian, the development of Library Service, the maintenance of a Bureau of Clinical Information under the direction of a Committee on Medical Education and the publication of a monthly bulletin. The interest of the endowment will be available for the inauguration and maintenance of these new activities, and when they have been continued as part of the Academy program for a number of years, the principal of this fund will be turned over to the Academy without restrictions.

The full-time-Director was appointed and began his duties January 1, 1924. He has taken over the administration of the Academy Building and the general supervision of the activities of the Academy. The Director serves as an active member of all committees and in some instances as secretary thereof. This coordinates effectively the activities of the various committees and makes it possible to keep the Council and Trustees better informed of the progress of the Academy's work, especially when there is no member of any particular committee present at the meeting of Council or Trustees. It is the Director's function also to assist the Treasurer in the preparation of financial reports and to make any special study of Academy affairs that may be suggested by the Council.

A Committee on Medical Education was appointed which consisted largely of former members of the Executive Committees of the Society for the Advancement of Clinical Information and

the New York Association of Medical Education, under the direction of this committee.

All of the post-graduate courses given in New York City were classified during 1924, each of the courses having been investigated by a sub-committee, and many of the courses were approved. These approved courses were published by subjects and the lists are available for those who desire them. In a number of instances, sub-committees have interviewed members of the Boards of Managers of Hospitals, the faculties of the medical schools and the medical staffs of hospitals, and have indicated when necessary what action should be taken in order to improve a course in order to secure the approval of the Committee. These conferences resulted in the suppression of a certain number of courses and in the improvement of many others.

A study of the special internships available for out of town physicians has also been made and a number of men have received internships as a result of advice given them by the Medical Secretary of the Committee.

The Bureau of Clinical Information, maintained under the supervision of the Committee, publishes daily lists of operations in New York City, which are furnished at a nominal cost to those who desire them. Lists of medical and other clinics are published regularly in *Medical Week*.

Four hundred and thirty-six visitors called at the Bureau of Clinical Information in 1924 and were given advice as to clinics and items of medical interest in New York City. These visitors came from every country in Europe, from South America, Hawaii, the Philippines, and also from China, Japan, India, Ceylon, Asia, Australia and South Africa.

PROJECTS

The library exists as a repository of books and journals on medicine and allied subjects, but so far it has not been able to provide modern library service which would facilitate reference and bibliographic work. It is proposed, therefore, to employ additional reference librarians and bibliographers who would prepare material. It is also expected that physicians will be able to telephone the library to ask for specific books or only to

indicate a subject and have a reference librarian assemble the books, pamphlets, and journals necessary and have them available in a special study room for the use of the reader. If a specific quotation or extract of an article were needed a Fellow should be able to telephone to the Academy and ask for a photostat copy of the article in question and have it delivered to him within twenty-four hours. Such service would presumably be rendered at cost to the Fellows.

Fellows of the Academy should be able to have books delivered or called for either by hand or by motor delivery. Books should also be loaned in the future not only to non-resident Fellows but also to other physicians. This would require the purchase of duplicate volumes which could be rented to physicians at a nominal weekly charge, which should be sufficient to pay for the extra book within a year.

There are important medical libraries also in Philadelphia, Albany, and Washington, and an effort should be made to district the areas between Boston and Washington so that the Academy could fulfill a useful function in loaning books to physicians in a particular district.

An additional expenditure is necessary for the purchase of a large number of books and for the completion of sets of journals and for the purchase of duplicates of special current volumes, this latter in order to increase the library facilities for the loan of books. An additional amount of cataloging is needed in the preparation of a definite shelf catalog and possibly to furnish medical schools and other institutions in New York and vicinity with duplicate catalog cards so that a medical school or institution having a medical library could tell at a glance whether or not a volume sought for was in the Academy of Medicine. The publication of the National Union Check List of Journals will, when finished, serve a useful purpose in advising the members of the Academy and users of the library of the location of every medical journal published which is available in the United States.

To accomplish this work will require a considerable addition to the library staff and for this new educational activity the income from the Rockefeller endowment will be available. The income.

however, will not be available for the purchase of a larger number of books annually nor for the completion of sets, or the replacing of back numbers, binding, subscriptions and other regular work already carried on by the library of the Academy.

It has not been considered a function of the Academy to maintain either a graduate or undergraduate school of medicine. The Academy is designed primarily to promote the art and science of medicine and to give opportunity to physicians regularly engaged in hospital work, or teaching or practicing, to keep abreast with current literature and to hear and talk with the leaders of medical thought at Stated or Section Meetings.

New York is the chief port of entry on the eastern seaboard and the large number of physicians in the United States who make a visit to the medical centers of Europe will, of necessity, pass through New York. The reverse is true, that nearly every European or South American physician comes to New York when visiting the United States. It has, therefore, been proposed that the New York Academy of Medicine should not only be the clearing house for information on all medical facilities available in Greater New York hospitals, dispensaries, medical schools, post-graduate schools, clinics, lectures and all other opportunities of interest to medical men, but that it should also be prepared to advise American physicians where to study or what centers of interest to visit in other countries. Similarly, the Academy should be prepared to advise foreign medical students and physicians who desire to study in the United States what facilities exist in this country in all branches of medical work. It is not proposed to duplicate in any way work that may be done by the American Medical Association, the Association of Medical Colleges, or the Council on Education and Hospitals of the American Medical Association. Conferences have been held with each of these organizations and there is a complete understanding that there shall be no overlapping or duplication of work.

The city of New York, with its large population and its multiplicity of hospitals, its six medical schools and its facilities for scientific research in medicine, offers larger opportunities for medical work than almost any other city in the world. These opportunities have not been coordinated and have not been made

known to the medical world, but with the development of the work just outlined and proposed, they will become more and better known and will fulfill a most useful purpose for the advancement of the practice of medicine and the promotion of high medical standards in the United States.

FUNCTIONS OF THE ACADEMY OF MEDICINE OF PARIS

In 1793, during the stormy times of the French Revolution, the Convention dissolved the Royal Academy of Surgery after it had existed nearly a century. Its name was feared as well as the possible royalist leanings of its membership, but the Royal Society of Medicine was allowed to continue its existence. On December 20, 1820, by royal decree of King Louis XVIII, an Academy of Medicine was created and the Royal Society of Medicine and the Royal Academy of Surgery were directed to place their archives in the custody of the new Academy which was ordered to continue the scientific labors of the two institutions then dissolved.

The active membership was limited to eighty-five and divided into three sections—medicine, with forty-five members; surgery, with twenty-five members, and pharmacy, with fifteen members. In 1829 the sections were increased to eleven and remain at that number to-day—Anatomy and Physiology, Medical Pathology, Surgical Pathology, Therapeutics and Natural History, Operative Medicine, Pathological Anatomy, Obstetrics, Hygiene and Legal Medicine, Veterinary Medicine, Physical and Chemical Medicine, and Pharmacy. In the same year the membership was increased to one hundred. There are also foreign members and free members not elected to any section.

Although the sections have remained the same for nearly a hundred years and no reason exists for the continuance of some of them, they cannot be changed except by vote of parliament, a difficult and almost useless task, for a pathologist may be elected to one of four or five sections and take part in the meetings of any section, a procedure which causes no inconvenience to such a

small group of elite. Section meetings are held twice a month and frequently several sections meet together, and full meetings are held every three months.

The proceedings of the Academy and contributions read at its meetings have been published regularly since 1836, and happily a complete set rests upon the shelves of the library of The New York Academy of Medicine.

Early in the Academy's history it became the habit of serious medical observers who were unknown or inexperienced and were not members of the Academy to send the report of their work to a member of the Academy to be read at a meeting and discussed by the Academy, and frequently the Academy has expressed its official opinion on these reports. Thus, in 1843, Hameau, an obscure country physician, sent a report to the Academy on the cause of contagious diseases and stated that there must be three characteristics: contagion, incubation, and regeneration, and proved theoretically that a virus was present in living persons and was carried by them, thus disseminating communicable diseases, and he also stated in regard to cholera that, "the patients are laboratories which form and perpetuate the disease."

The continued high calibre of the reports presented to the Academy and their publications in the BULLETIN has made it an invaluable repository of medical knowledge and a chronological report of the progress of French medical science.

Among the original members of the Academy were Laennec and Louis, but Laennec died before the appearance of the first numbers of the BULLETIN. Louis, however, made his most important communication on the statistical method of studying disease before the Academy in 1837.

From that time on, a long series of new discoveries were reported before the Academy and printed in its BULLETIN. In Physiology the important contributions of Chauveau and Marey, on the circulation, were published, and in Neurology a description of cerebral apoplexy by Trousseau, muscular atrophy by Cruveilhier, and the epoch-making work of Broca on aphasia. Curiously enough, Duchenne and Charcot never contributed any of their work before the meetings of the Academy, but Fournier reported before the Academy on his memorable researches on the syphilitic

origin of tabes and general paralysis. Louis, in 1841, first described typhoid fever. In 1866 Villemin reported on the cause of tuberculosis and proved for the first time that it was a communicable disease.

Pasteur made a series of famous communications to the Academy between 1878 and 1886, among them being the reports on the production of anthrax in fowls formerly immune to this disease after chilling the fowls, a demonstration of streptococci as a cause of purpural fever, furuncles, osteomyelitis, the infection of the ground by anthrax, vaccination of cattle against anthrax and vaccination against rabies, as well as other important researches which were reported to the Academy of Sciences.

In the realm of surgery Guerin first described sub-cutaneous tenotomy, Chauveau and Arloing described the bacteriological genesis of gangrene. Koerberle, of Strasbourg, in 1861 reported on the favorable results of ovariectomy in certain cases, but Malgaigne criticized him severely, stating that women would be made idiots if the operation were performed and even Velpeau wrote that whoever performed this operation on a woman would be an assassin. It was also Koerberle who reported on the use of arterial forceps to produce hemostasis.

Dieulafoy first described his method of aspirating plural fluids and in 1894 Delorme reported on his first thoractomy.

Among other members of the Academy whose reports appeared in the BULLETIN are found the names of D. and H. Larrey. Sedillot, Civiale, Lisfranc, Dupuytren, Guerin, Nelaton and Chassaignac.

Perhaps then the first function of the Academy of Medicine of France has been the maintenance of scientific sections where the progress of medicine was reported and announced to the medical world by means of the BULLETIN.

The original decree creating the Academy gave to it the following functions and Article II of the ordinance reads in part as follows:

"Created primarily to answer questions of the government in everything related to the public health and particularly on epidemics, diseases peculiar to certain countries, the different cases of legal medicine, the manufacture of vaccine, the examination of

new and secret remedies, internal as well as external, mineral waters, natural or certified, etc. It is further charged with continuing the work of the Royal Society of Medicine and the Royal Academy of Surgery, and will occupy itself with all questions of study and research which may contribute to the progress of the different branches of the art of healing."

Within a few years after its creation, four permanent committees were appointed on epidemics, vaccine, secret remedies, and mineral waters and for over one hundred years the Academy has from time to time made pronouncements on the subject of epidemics, recommending methods to be used to suppress them or measures to be employed for their prevention. As the official advisory body to the Government on public health, it has constantly made recommendations to the Government. It will well be understood in this country that such recommendations are only tardily complied with. For nearly fifty years the Academy had maintained a vaccine laboratory and distributed vaccine for the prevention of small-pox, and had recommended its use in the army and in 1868 recommended the compulsory vaccination of all children, but this was not voted as a law until 1872, too late to prevent twenty-three thousand deaths in the army in 1870 and fifteen thousand deaths in Paris in 1871. Similarly, in 1911, the Academy recommended to the Government compulsory vaccination of the army against typhoid fever and one of its members, Dr. Labbé, a member of Parliament, fought valiantly for the adoption of the law, but it was only passed in 1915 after there had been over fifty thousand cases of typhoid in the French army. There has always been a considerable interest in the control and use of mineral waters in France. Beginning with the latter part of the nineteenth century a special laboratory was maintained for the chemical and bacteriological examination of mineral waters. All mineral waters sold in France are licensed and their production is under the supervision of a permanent committee of the Academy of Medicine. The permanent commission on secret remedies makes frequent recommendations but the appearance of many advertisements of secret and patent French remedies in the lay and medical press do not demonstrate that its labors have been very successful.

The administration of the Academy is carried on by the President and the Permanent Secretary and technicians are employed for carrying on the work of the vaccine and water laboratories.

The Academy has a small but excellent library of classics but there are few modern books or journals. Its prestige rests upon the importance of the reports read at its meetings and their discussion, the publication of the invaluable BULLETIN, its work in the eradication of small-pox, and its constant efforts to persuade the Government to undertake necessary hygienic measures for the promotion of the public health.

CONVALESCENT CARE

On June the 4th, 1925, a conference with representatives of convalescent homes and social agencies was held at the Academy of Medicine under the joint auspices of the Public Health Committee of the New York Academy of Medicine and the Hospital Information Bureau of the United Hospital Fund.

At this meeting the several problems relating to institutional convalescence were discussed, and a summary report of the recommendations of the four special sub-committees of the Public Health Committee was presented. At the close of the conference the following resolutions were passed. We are also publishing in this issue a copy of the summary report.

RESOLVED:

First, that this conference of representatives of convalescent homes and social agencies assembled at the Academy of Medicine on June the 4th express its thanks for the constructive work done by the Public Health Committee of the New York Academy of Medicine in formulating for the first time in the annals of medical history of this city standards of medical care and management of homes for convalescent patients, as these standards will prove of effective service to all of the institutions;

Secondly, that we endorse in general the principles in the report of the Public Health Committee; and

Thirdly, that we heartily approve the suggestion that the Hospital Information Bureau should operate the central reference office on convalescent problems in co-operation with the Public Health Committee of the New York Academy of Medicine, the Hospital Social Service Association, the Sturgis Fund of the Burke Foundation, the Children's Welfare Federation, and all other agencies interested in the work of promotion of proper convalescent

care in this city, and express the readiness on the part of all those assembled to help in making the Bureau an effective agent in the field of convalescent care.

SUMMARY REPORT ON INSTITUTIONAL CONVALESCENCE

MEDICAL AND ADMINISTRATIVE STANDARDS FOR THE GUIDANCE OF CONVALESCENT HOMES

The problem of convalescence is an important though neglected phase of medical interest. It is directly related to the practice of medicine as well as to community health and hospitalization. Although in New York City a greater amount of attention has been given to the problem of convalescence than in other American communities in the way of providing institutional facilities, yet consideration of the fundamental principles underlying this whole problem of convalescence has just begun. In the case of children we have provided not only institutional facilities, but through the Speedwell Society of New York an effective method has been devised of placing children in selected families which remain under constant supervision of the officers of the Society. In the whole field of American medical literature, there are but few references to the subject of institutional convalescence, and only a few men have given any serious attention to it. Dr. Frederic Brush, of this City and Dr. John Bryant of Boston, are the only two men who have written extensively on the subject.

The subject well deserves a thoughtful consideration from every angle—first and foremost, the medical; secondly, the administrative and organizational; thirdly, that of the health of the community; and fourthly, the relieving of pressure on the hospitals. We have in New York City a sufficient number of hospital beds, and by proper development of convalescent facilities further demands upon hospitals can be met without any investment in additional buildings for some time to come. Furthermore, the present cost of caring for a convalescent patient in a convalescent home is approximately one-third of what it costs in a hospital. If convalescent care be carried on in accordance with the suggestions to be offered here, the cost will be slightly

higher than it is at the present time, but will still remain far below that for hospital care. The original investments in convalescent homes are likewise much smaller than in the case of hospitals.

Adequate convalescence often prevents recurrence of disease; it likewise affords a check on quackery and charlatanism.

Prevention of disease is one of the great factors in a community health program. Preventoria for various types of people on the verge of a breakdown are greatly needed, and their development would constitute a desirable social investment. This phase of the problem will not be considered, however, in the paper which I am submitting from the Public Health Committee of the New York Academy of Medicine, because the matter under consideration by the Committee has been entirely restricted to convalescence in the more technical sense of the word, that is, the period following the acute manifestation of disease.

In the autumn of last year Dr. Charles L. Dana, the chairman of the Public Health Committee, appointed four sub-committees to formulate standards for the care and management of the several major types of convalescent patients, medical, surgical, neurological, and pediatric. The sub-committees have been at work during several months and have prepared detailed and extensive reports which will undoubtedly prove of considerable value to this as well as other communities. These reports will be published in extenso in appropriate journals and reprints will be available for distribution. The present report is but a brief summary of the main recommendations contained in the reports.

THE DEFINITION AND VALUE OF CONVALESCENCE

A convalescent patient is one who has passed the acute stage of his illness but is not yet able to resume his usual life and activity.

The value of proper convalescent care lies in the chance it gives for the recuperative processes to proceed unhampered and thereby to hasten the return of the patient to the customary mode of life and work.

The time necessary for proper convalescence varies with the nature and extent of the illness as well as with the recuperative

powers of the individual. No hard and fast rule can be laid down in this respect. Two weeks is considered as a minimum for the average adult and one month for the child.

SEGREGATION OF PATIENTS

While in a large institution consisting of several units it is practical to take care of many types of patients, there are very few such institutions in existence. From the point of view of the care of the individual patient, as well as proper personnel and equipment, it is desirable to segregate specified types of patients in separate institutions.

It is desirable to segregate the bulk of neurological patients in special homes where the management and routine can be adjusted to their peculiar needs.

The patients suffering from heart disease require a method of management entirely different from the average run of patients. Here again it is desirable to have homes devoted exclusively to this type of patient.

Orthopedic patients also require a different type of equipment and management; they also differ from other patients in the length of time required for convalescence; they are, therefore, likewise better cared for in institutions especially designed for this type of work.

Patients recovering from respiratory diseases are often a source of danger and annoyance to other patients; it is, therefore, desirable to segregate them either in separate homes or in a separate pavilion of a large institution. Patients suffering from alimentary diseases or those requiring special diets are better cared for in institutions which are equipped with dietary and laboratory facilities required for the care of this type of patient.

Children fare better if segregated in separate institutions because of the different regimen required for them; furthermore, the adult patients are usually disturbed by child patients treated in the same institution.

In institutions for adults it is desirable to have the two sexes treated in the same institution, provided proper facilities and supervision can be provided.

With regard to color there is no rule which can be laid down. It is for each individual institution to decide whether the mixing

of white and colored patients is to the best interests of those served. The need for convalescent facilities for negro patients is generally recognized.

In the segregation of patients it is desirable to pay attention to the habits and standard of living of certain types of patients. Segregation in this respect is desirable for the welfare of patients of refinement.

Adequate facilities should be provided for pay patients of moderate means. Accommodations of this kind for children should likewise be provided.

The problem of providing facilities for convalescent mothers with children is a difficult one. Arrangements for taking care of the children outside should be made, and only if this be found impossible should children be accommodated with the mothers at the convalescent home.

LOCATION OF CONVALESCENT HOMES

The location of convalescent homes should be preferably outside the strictly urban section but accessible by rail, trolley, or bus. A rural location in general would seem preferable to the seaside although the latter has its advantages. Homes for the cardiac patients should be situated in a rural district rather than at the seaside and should not be above 1,200 feet altitude.

SIZE

The size of the convalescent homes should be governed by the type of patient cared for as well as economic efficiency. A fifty-to sixty-bed unit is considered an optimum size. Larger convalescent homes should consist of units which should be multiples of this size.

EQUIPMENT

It should be the policy of the institutions to provide single or double rooms for adults; in no case should the rooms hold more than four persons. Dormitories for children should likewise be designed on the principle of only a few beds in each ward, and proper spacing maintained between beds. The equipment of convalescent homes should aim at comfort without extravagance

and should provide adequate bathing and toilet facilities, reading and recreation rooms.

Every institution should have adequate facilities for isolation. In case of a child-caring institution two percent of the total number of beds should be in the isolation unit.

The dining room should be connected by a covered passageway with the dormitories, if it be located in a separate building. It should be the aim of every convalescent home to provide properly balanced, wholesome and appetizing food.

A gymnasium and out-of-door as well as indoor recreation facilities are desirable features of a convalescent home. A convalescent home should aim to be not only a restorative but an educational influence in forming regular habits of life and sound mental attitudes.

There should be a minimum of ordinary and occupational as well as physio-therapeutic equipment and of supplies. The equipment should be more elaborate in institutions dealing with special types of cases. The details with regard to types of equipment needed are given in the respective reports of the sub-committees of the Public Health Committee of the New York Academy of Medicine.

PERSONNEL

Each institution, whether small or large, should have a trained nurse and dietitian and recreational director. In the smaller institutions one person could combine two or three of these functions.

Every institution should have a visiting physician, who should not only be on call but should also be required to visit regularly and should be chosen from among the local practitioners.

Special institutions for the care of neurologic, cardiac and surgical cases should have either a resident physician or a physician attending daily, who should be trained in the management of cases of the particular type cared for in the institution.

All convalescent homes should have one or more consulting physicians who should be responsible for the general policy of the institution and who should visit at least once a month to supervise the carrying out of the policy.

THE RELATION OF THE CONVALESCENT HOME TO THE HOSPITAL

In order that the interest of the individual patient be protected and best results obtained, particularly in surgical and cardiac cases, there should be a continuity of treatment control. The hospital which is directly responsible for the treatment of the patient while the patient is under its roof is morally responsible for it when the patient is transferred by the hospital to a convalescent home. Each hospital should designate one or several of its junior attendings to serve during specified periods as liaison officers who would respond to calls by the convalescent homes for consultation in those cases which do not appear to be making satisfactory progress.

ADMINISTRATIVE MANAGEMENT

1. *Admission*: After a definite policy has been adopted by each of the convalescent homes with reference to the types of cases they are equipped and ready to take care of and this has become generally known, the hospitals may be relied upon to refer the proper types of cases to the convalescent homes. There is no need for each convalescent home to have a New York admitting office with a physician. Only cases which are referred through agencies other than hospitals should be made to undergo a physical examination in the admitting office in New York. It is suggested that several of the smaller convalescent homes for reasons of economy might maintain a joint admitting office.

It is also desirable that convalescent homes should maintain buses and be responsible for the transportation of patients to and from the convalescent homes, particularly in case of children. For institutions located in fairly close proximity it might be practical to operate a bus service jointly.

2. *Discharge of Patients*: No patient should be discharged except upon the recommendation of the visiting physician. Recalcitrant or otherwise objectionable patients should be sent back either to their homes or to the institutions from whence they came.

3. *Regimen*: A carefully mapped out routine for the patients should be devised in consultation with the medical authorities of the institution. The medically prescribed play exercises and

rest periods should be closely supervised, especially in the case of children and cardiac patients. The various chores that may be required of the patient should be included in the total amount of exercise required of the patient.

4. *Records*: In every convalescent home there should be kept a proper record of each patient. In the record there should be included the findings of physical examination and a chart of weight (which is particularly important in the case of children), a statement of the treatment and diet prescribed, and any interruption in steady convalescence. In the institutions caring for special types of cases like children, cardiac and diabetic patients, the records should be more elaborate as they are important as an aid in the furthering of scientific knowledge.

SOCIAL SERVICE

As the majority of patients come from hospitals and dispensaries, it is advisable that on discharge a record of progress be sent back to the hospital for special follow-up, as this may be of value to the medical authorities in institutions from which the patients were referred. In the case of patients referred by social agencies or private physicians, copies of the patients' records should be forwarded to those who referred the patients.

Convalescent homes should not attempt to do follow-up work as this would be a duplication of effort and of responsibility of the hospital and the out-patient department.

EXTENT OF NEED OF CONVALESCENT FACILITIES

It is very difficult, well-nigh impossible, to determine with exactitude the number of beds and types of institutions needed to meet the convalescent needs of a city like New York. We do not possess adequate morbidity statistics to gauge the magnitude of the problem. We know, however, that about three-fourths of the 400,000 patients passing annually through our hospitals are ward patients; that every year about a million people seek medical advice at the dispensaries; that about 45,000 patients are served in their homes by the Visiting Nurse Service of the Henry Street Settlement, and many times that number are cared for in their homes by private physicians. Economic and family condi-

tions have an important bearing on the need and utilization of institutional convalescent accommodations, particularly the housing conditions, the family savings, the fear of losing a job in the case of the sick breadwinner, and the home responsibilities in the case of a sick woman with children. Some of these considerations have a deterring influence on the use of the convalescent homes. In many cases, however, it is the ignorance of available facilities, or a distrust of institutions, that deprives the convalescent patient of receiving the proper health opportunity.

The demand for institutional convalescent care can be greatly increased by educational effort on the part of physicians, nurses, social workers and others associated with the care of the sick. The demand is a variable quantity, and the estimate of the community needs of accommodation for convalescent patients should be based on the potential rather than on the effective demand at any particular period.

The present-day facilities are inadequate in that they do not come up in the majority of instances to the standards considered desirable, and in that they do not provide segregated service for the special types of convalescent patients.

THE IMMEDIATE PROBLEM

The immediate problem before our community is reorganization rather than extension of existing facilities. A series of conferences on the subject should be held with the view of dividing the field into sections in accordance with the recommendations of the four sub-committees of the Public Health Committee, and to suggest to each institution the required personnel and equipment. It seems more important to begin the task by improving the quality of the work now being done in the existing institutions than by urging immediate extension. The municipality as well as private philanthropy will undoubtedly respond in a generous spirit as soon as the preliminary organization and division of the work has been accomplished and further needs definitely determined.

THE CENTRAL CLEARING HOUSE

There is likewise a well-recognized need of a central clearing house where a daily census would be kept of available accommo-

dations in all of the convalescent homes. Such a bureau would greatly facilitate the work of placing the patients and would obviate the need of making inquiries at each individual institution. Such a clearing house would in time become an important factor in the situation by the accumulation of facts concerning available facilities and the character of the work performed at the different institutions. It would serve also in securing better utilization of the convalescent homes than is the case at the present time. It is true that there will always exist preferences on the part of the patients as to the institutions to which they would like to go, as well as inequality in the standards maintained, but by following the principle of specialization and with the general improvement of administration, these difficulties would be obviated to a large extent. The bureau should not attempt to exercise the function of placing patients, but should serve merely as a source of information with regard to existing facilities. This bureau would likewise stimulate and assist in studies based on the experience of the several convalescent homes. Such studies are greatly needed in order to plan future work intelligently. Too little has been attempted in this direction. Only very few of the convalescent homes have analyzed their work with any approach to scientific method. Work of this kind presupposes adequate records kept by trained observers.

The Hospital Information Bureau of the United Hospital Fund is ready to start a clearing house of the type above described, and has secured the active cooperation of the Sturgis Fund of the Burke Foundation and of the Hospital Social Service Association. Undoubtedly many other agencies in the field would lend their support and cooperation to the bureau. It is therefore the recommendation of the Public Health Committee of the New York Academy of Medicine that the convalescent homes avail themselves of the services proffered by the Hospital Information Bureau to organize such a service for the benefit of the convalescent homes, the hospitals and the community at large.

RETIREMENT OF MR. JOHN S. BROWNE

In 1875, after the Academy had moved into its new quarters at 12 West 31st Street, advertisements were placed in the newspapers announcing an examination for Librarian. Some twenty candidates presented themselves. Among the twenty candidates was a young man who had, for several years, been working as a library assistant in the Astor Library. This young man, Mr. John S. Browne, was the successful candidate and was appointed Librarian of the New York Academy of Medicine.

During Mr. Browne's forty-four years of service, in addition to his duties as Librarian, he was also the moving factor in the entire Academy having been bookkeeper, clerk and accountant as well as Librarian, and since the Academy has been in its present quarters, superintendent of the building. In his administration of the Academy's affairs Mr. Browne was always tactful and kindly and readily accepted and discharged responsibilities.

The Council realized several years ago that with the development of the new Academy a younger Librarian was needed, for, notwithstanding Mr. Browne's interest and enthusiasm, not even he could deny the accumulation of years. The Council, desirous of having Mr. Browne's advice and counsel on sundry matters, was loath to retire him but finally decided he should be placed on inactive duty on August first with the title of Consultant Librarian.

In May, 1925, in accordance with an authorization of the Council, the President appointed a special committee to take suitable action upon the retirement of Mr. Browne. This committee consisted of all the former Chairmen of the Library Committee, with Dr. W. Gilman Thompson as its Chairman. With the approval of the Council, the committee solicited contributions so that a purse might be presented to Mr. Browne which would enable him to purchase a house in the suburbs of New York, for the former Trustees of the Academy and in particular Dr. A. Jacobi and Dr. Joseph D. Bryant had planned the present building so that Mr. Browne and his family would have a permanent home and Mr. Browne had always been assured that his home was available for life.

The Fellows of the Academy responded most generously to this opportunity to contribute to Mr. Brownne's welfare in appreciation of the splendid service which he had rendered to the Academy and on July 29th the committee waited upon Mr. Brownne and presented him with the purse and with a beautifully engrossed resolution thanking him in behalf of the Academy for his contribution to its work and welfare. The resolution read as follows:

John S. Browne, Librarian of the New York Academy of Medicine for forty-five years, during which time the Library has grown from a small to a great collection of medical literature, is about to retire from active service with the title of Consultant Librarian.

By his untiring efforts he has obtained gifts and support for the Library. By his amiability and constant readiness to help, he has won the admiration and friendship of the Fellows and of the general reading public. The Committee on Library has benefited greatly by his wise counsel and his rare discrimination and judgment in the selection of books, and the entire Academy has profited by his devotion to the interests of the Library which he has done so much to foster and develop.

On behalf of the Fellows of the New York Academy of Medicine, and in recognition of his great service as Librarian for so many years, we desire to express to him our sense of deep obligation, to wish him long health and happiness, and to present to him a token of our appreciation and esteem.

RESOLVED, That by and with the consent of the Council and the Trustees, these resolutions be spread upon the minutes of the meeting of the Committee on Library and of the Council of the New York Academy of Medicine.

W. GILMAN THOMPSON,
Chairman.

Frederick Peterson	Charles N. B. Camac	Herbert S. Carter
Edward D. Fisher	Lewis A. Connor	Frederick Tilney
Augustus Caille	Thomas Lathrop Stedman	Karl M. Vogel
Alfred Meyer	Haven Emerson	Harold D. Senior
Charles L. Gibson	Robert J. Carlisle	Charles A. Elsberg
Walter B. James	Lewis Fox Frissell	Frank J. Blodgett
Joseph Collins	Arthur B. Duel	J. Ramsay Hunt
Hermann G. Klotz	Warren Coleman	Russel L. Cecil

During Mr. Brownne's years of office, the Library has grown from 10,000 volumes to 138,000 books and 100,000 pamphlets. The staff has increased from one to seven, but perhaps the most notable service rendered by Mr. Brownne was the development of the General Library Fund and the special funds of the

Library, for it was largely due to his efforts that the Herrick, Jacobi, Farnham and Witthaus bequests were made to the Academy for Library purposes. The General Library Fund was built up by him through the sale of duplicates and triplicates and from small donations and the total fund has increased from nothing to \$41,570 during his years of service.

In retiring from active duty, Mr. Brownne takes with him the good wishes of all the Fellows of the Academy and their hope that his future years may be happy and congenial and that he may frequently be seen within the walls of the new building.

Mrs. L. E. Smith was named Acting Librarian by the Council.

BOOK REVIEW

THE LIFE OF SIR WILLIAM OSLER*

Canadians especially have eagerly awaited the advent of these volumes and we venture to say that now the biography is published they will have no disappointment but the greatest pleasure in following Osler's career step by step throughout his life of three score years and ten. The author, the Professor of Surgery at Harvard University, was well chosen. Someone in England once remarked that it was curious that a surgeon should be Osler's biographer, but if the surgeon is big enough, and liberal-minded enough, Medicine in its broadest aspect must come within his purview. Besides, Dr. Cushing was peculiarly fitted for the task; he knew his hero well during the Baltimore days both within the walls of the Johns Hopkins Hospital and as his next-door neighbor for several years in West Franklin Street; they had much in common in their love of rare old medical books and their authors; and even when the Atlantic lay between them there were visits from both sides and a constant stream of letters and post cards in both directions. Many of Sir William Osler's letters to his biographer are published in these volumes without the fact being made known that they were addressed to Dr. Cushing.

* *The Life of Sir William Osler.* By Harvey Cushing, Oxford at the Clarendon Press, 1925, 2 vols. 8° and Oxford University Press, Canadian Branch, Toronto.

the credit of the *fait accompli*. This is of course the great secret of getting things done in the world as many know; but he practiced it, as many do not."

No one, we think, did his duty towards his fellow man better than Osler, but he realized too that he had a duty towards himself. When quite young he saw that to educate himself, and to get time to do this, he would have to withdraw and seek a quiet spot for himself and his book. He loved companions, but no matter who his visitors were he would go off to bed comparatively early and read for half an hour or more—and it was not mere lolling in bed with a light novel but close attentive perusal of the works in prose and verse of the world's greatest writers. And scarcely ever did Osler read without jotting down notes in his commonplace books.

It was the realization of this duty towards himself which led him to leave Baltimore and go to Oxford. He felt that, at the pace at which he was compelled to live by the demands from every side for his medical skill and his help in many other sorts of ways, he could not last much longer. This move required courage. In fulfilling this duty towards himself and towards his family by going to the Old Country he found a little leisure to cultivate extensively his taste for medical history and for bibliography. Indirectly the medical world at large has benefited much from this, for his lectures upon *The Evolution of Modern Medicine* and numerous historical essays were prepared in England. In Oxford he also set about adding judiciously to his library, so that when he died he left one of the choicest collections to be found anywhere of books illustrating the history of medicine and the ancillary sciences. He bequeathed this library to McGill University and it is still being catalogued according to his own and very original plan. One of the most valuable points in these volumes is the way in which Dr. Cushing has told, year by year, of the books Osler was reading and of their authors. Very often the titles are given in footnotes and the young physician who wishes—and has perseverance enough—can give himself the same sort of pleasant companionship with the authors and education from their works as Sir William Osler did.

A charming feature of this biography is the inclusion of many of Osler's brief epistles to little children. He was the friend of

old people—and he hated to hear the advance of their days alluded to—but he was the playful companion of those tender years. Only one gifted with the greatest sympathy and imagination could get down on the floor and frolic with children even in his latest years and could write such amusing letters to them. Often he “made pretend” as when he assumed a mock serious tone and signed his note “John McAdoo, Chief of Police.” Indeed these communications are only “trifles,” but we beg to think they reveal much of this great man’s character. Mention, too, must be made of the quotations from the letters written by Lady Osler which are indispensable in filling in the background. She was his companion all the way and towards the end of his life the road wound so much up-hill that he had still greater need of her. Her way of taking hold of things and her deep interest in all his interests made it possible for him to give himself up to his many and varied activities.

The illustrations, most of them from photographs, are as well produced as we have ever seen them in a book and the printing and paper are such that even the Clarendon Press (of which Sir William Osler was a Delegate) should be proud. The index is full and of itself almost forms a dictionary of medical biography and medical history.

In reading these volumes, on almost every page of which appear the names of new people and new places, we see Osler as if in the flesh. We see him as a “propagandist of public health measures,” and as such Dr. Cushing feels he performed his “greatest professional service”; we see him as a biologist and pathologist, as an almost unrivalled clinical observer and teacher, as an author of the most considerable text-book of medicine of modern times, and as an author of many essays which will not soon cease to inspire medical men with a love for their profession and its ideals; we see him as a bibliophile and sympathetic historian of medicine; and finally we see him as he moved in and out among his fellow men (always lending a helping hand) living his motto *Æquanimitas* in joyous times and sad. His life was so beautiful in all its aspects and in all its actions that when we are placed in difficult or trying circumstances we feel as if we should ask ourselves: “What would Osler have done in our

place?" The reading of these volumes will give us the answer many and many a time.—*Archibald Malloch*. (*Canadian Medical Association Journal*.)

RECENT ACCESSIONS TO THE LIBRARY

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- British Malaya opium committee. Proceedings. . . .
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- Brodhead, G. L. Approaching motherhood.
N. Y. Hoeber. 1925. 193 p.
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- Buchanan's manual of anatomy. 5 ed. Ed. by E. Barclay-Smith [et al.].
Lond. Bailliere. . . . 1925. 1702 p.
- Calmette, A; Negre, L. & Boquet, A. Manuel technique de microbiologie et serology.
Paris. Masson. 1925. 568 p.
- Cancer: post-graduate lectures. . . . Edited by H. J. Paterson.
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- Cleverdon, W. S. L. The water supply of buildings and rural
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- Cumberbatch, E. F. & Robinson, C. A. Treatment of gonococcal infection by diathermy.
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- Falk, H. C. Operating room procedure: for nurses and internes.
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- Read, C. Man and his superstitions. 2 ed.
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- Williams, F. E. (et al.). Social aspects of mental hygiene.
N. Haven. Yale. 1925. 150 p.
- Wyatt, R. B. H. Bacteriology for dental students.
Lond. Oxford pr. 1925. 134 p.

ANNOUNCEMENTS

LAYING OF THE CORNERSTONE OF THE NEW BUILDING

The cornerstone of the new building of The New York Academy of Medicine will be laid on Friday afternoon, October 30th, at 4.30 p.m.

THE CARPENTER LECTURE

The Wesley M. Carpenter Lecture for the current year will be given by Dr. Llewellys F. Barker at the Academy on the evening of October 15 at 8:30 p. m. The subject will be "The practical management of neurotic patients."

THE ANNIVERSARY DISCOURSE

The Anniversary Discourse will be delivered by Dr. George E. Vincent, President of the Rockefeller Foundation, at the Academy on the evening of November 19. The subject of the discourse will be announced later.

THE BIGGS MEMORIAL LECTURE

In memory of the late Dr. Hermann M. Biggs, who did so much to bring about the successful public control of tuberculosis in America, Mrs. Frances R. Biggs has created a fund with the New York Tuberculosis Association of \$2,500 for the endowment of a lectureship to be given annually before the Medical Society of the County of New York.

The first lecture will be given at 4:00 p. m. November 19, 1925, at The New York Academy of Medicine, by Dr. William H. Park, Director of Laboratories, New York City Department of Health.

DEATHS OF FELLOWS OF THE ACADEMY

WALTER BUCKLEY JOHNSON, 170 Broadway, Paterson, N. J.; born in Paterson, N. J., January 3, 1856; graduated in Medicine from the College of Physicians and Surgeons, New York City, in 1878; elected a Fellow of the Academy June 4, 1891; died July 30, 1925.

JOHN PHILIP REILLY, 215 Elizabeth Avenue, Elizabeth, N. J.; born in Platteville, Wisconsin, April 26, 1860; graduated in Medicine from Bellevue Hospital Medical College, New York City, in 1888; elected a Fellow of the Academy February 4, 1909; died August 15, 1925.

AUGUSTUS WALTER SUITER, Herkimer, N. Y.; born in Herkimer, N. Y., May 13, 1850; graduated in Medicine from the College of Physicians and Surgeons, New York City, in 1871; elected a Fellow of the Academy May 7, 1891; died May 28, 1925. Dr. Suiter was a Fellow of the American Medical Association.

DONATIONS TO THE LIBRARY FUNDS

Donations and bequests are solicited by The New York Academy of Medicine for the maintenance and expansion of the Library.

A donation or bequest of \$5,000 or more will provide for a special library fund, the income of which may be used for the general purposes of the Library or restricted to the purchase of books and periodicals, as the donor or testator may indicate. When so restricted, a special bookplate will be used. A donation or bequest of less than \$5,000 but more than \$1,000 will provide for a named library fund, the income of which will be used for general library purposes or restricted for the purchase of books and periodicals, as desired by the donor or testator.

Donations of less than \$1,000 will be added to the general library funds.

FORM OF BEQUESTS

The following is a brief legal form as a suggestion under which bequests may be made in behalf of the Academy:

I give, devise and bequeath unto "The New York Academy of Medicine" of the City of New York, State of New York, a corporation duly incorporated by the Legislature of the State of New York by an act, entitled "An act to incorporate The New York Academy of Medicine," passed June 23, 1851, and amended June 4, 1853, and June 2, 1877

DATES OF MEETINGS

Stated Meetings of the Academy, 1st and 3rd Thursdays.

Trustees, 2nd Wednesday.

Council, 4th Wednesday.

Committee on Library, 2nd Tuesday.

Committee on Admission, 1st Wednesday.

Public Health Committee, Mondays.

Committee on Medical Education, 3d Wednesday.

Building Committee, 1st and 3rd Tuesdays.

Publication Committee, date varies.

Program Committee, date varies.

DATES OF SECTION MEETINGS

Dermatology and Syphilis, 1st Tuesday.

Surgery, 1st Friday.

Neurology and Psychiatry, 2nd Tuesday.

Pediatrics, 2nd Thursday.

Otology, 2nd Friday.

Ophthalmology, 3rd Monday.

Medicine, 3rd Tuesday.

Genito Urinary Surgery, 3rd Wednesday.

Orthopedic Surgery, 3rd Friday.

Obstetrics and Gynecology, 4th Tuesday.

Laryngology and Rhinology, 4th Wednesday.

Historical and Cultural Medicine, date varies.

COMMITTEES OF THE ACADEMY

Committee on Admission

NELLIS B. FOSTER, *Chairman* FREDERICK T. VAN BEUREN, JR.
JOHN J. MOORHEAD GEORGE B. WALLACE
ARTHUR M. WRIGHT

Committee on Library

HAROLD D. SENIOR, *Chairman* CHARLES A. ELSBERG
FRANK J. BLODGETT J. RAMSAY HUNT
RUSSELL L. CECIL

Public Health Committee

CHARLES L. DANA, *Chairman*

Executive Committee

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ROBERT J. CARLISLE JAMES A. MILLER GEORGE B. WALLACE
JAMES B. CLEMENS FREDERIC E. SONDERN E. H. LEWINSKI-CORWIN,
LEWIS F. FRISSELL W. GILMAN THOMPSON *Executive Secretary*

Committee on Medical Education

CHARLES N. DOWD, *Chairman*

Executive Committee

ARTHUR F. CHACE EMANUEL LIBMAN DUDLEY ROBERTS
HAVEN EMERSON JAMES F. MCKERNON GEORGE GRAY WARD
JAMES EWING WALTER L. NILES FREDERICK P. REYNOLDS,
CHARLES L. GIBSON WILLIAM H. PARK *Medical Secretary*
EMIL GOETSCH EUGENE H. POOL
GRACE CARSTENSEN, *Executive Secretary*

Building Committee

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SAMUEL A. BROWN WALTER L. NILES
CLARENCE C. BURLINGAME FREDERICK T. VAN BEUREN, JR.
SIGISMUND S. GOLDWATER ARTHUR M. WRIGHT

Nominating Committee

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ROBERT J. CARLISLE LEWIS F. FRISSELL

Committee on Revision of the By-Laws

HERBERT S. CARTER, *Chairman* ROYAL S. HAYNES
JOHN A. HARTWELL FENWICK BEEKMAN

Committee on Publication

CHARLES L. DANA, *Chairman* E. LIVINGSTON HUNT
FENWICK BEEKMAN ALBERT R. LAMB
SAMUEL A. BROWN FREDERIC E. SONDERN
CHARLES A. ELSBERG GEORGE B. WALLACE

Program Committee

THE PRESIDENT THE VICE-PRESIDENTS THE DIRECTOR

OFFICERS OF SECTIONS

Dermatology and Syphilis

Chairman
FRED WISE *Secretary*
OSCAR L. LEVIN

Surgery

JOHN J. MOORHEAD FREDERIC W. BANCROFT

Neurology and Psychiatry

CHARLES A. MCKENDREE E. D. FRIEDMAN

Pediatrics

HOWARD H. MASON LOUIS C. SCHROEDER

Otology

ISIDORE FRIESNER J. MORRISSET SMITH

Ophthalmology

CONRAD BERENS DAVID H. WEBSTER

Medicine

HOWARD F. SHATTUCK EDGAR STILLMAN

Genito Urinary Surgery

WM. F. MCKENNA FREDERICK T. LAU

Orthopedic Surgery

SIGMUND EPSTEIN HARRY FINKELSTEIN

Obstetrics and Gynecology

EDWIN W. HOLLADAY HARBECK HALSTED

Laryngology and Rhinology

ANTONIE P. VOISLAWSKY JOHN E. WELCH

Historical and Cultural Medicine

L. PIERCE CLARK CHARLES E. ATWOOD

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BULLETIN
OF
THE NEW YORK
ACADEMY OF MEDICINE

INSTITUTED 1847
SECOND SERIES, VOL. 1, No. 7

SEPTEMBER, 1925

ANNUAL REPORT FOR THE YEAR 1924



PUBLISHED MONTHLY BY
THE NEW YORK ACADEMY OF MEDICINE
LANCASTER, PA.
Lime & Green Sts.
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17 W. 43d St.

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OFFICERS OF THE ACADEMY

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GEORGE DAVID STEWART.

Vice-Presidents

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Legal Counsel

FRANK L. POLK, ESQ.

Entered as second-class matter, April 6, 1925, at the postoffice at Lancaster, Pa., under the Act of August 24, 1912.

Proceedings of the Annual Meeting

HELD JANUARY 15, 1925

THE NEW YORK ACADEMY OF MEDICINE

VOL. I

SEPTEMBER, 1925

No. 7

ADDRESS OF THE RETIRING PRESIDENT

GEORGE DAVID STEWART

Public Health Committee

Early in its history The New York Academy of Medicine stated in its Constitution that one of its objects was the promotion of public health. In 1852 to fulfill this conception of its function it created a standing Committee on Public Health. In 1858 a Section on Public Health and Legal Medicine was established which continued until 1911 when it was abolished at its own request and replaced by the present Public Health Committee. This Committee has been in continuous weekly sessions ever since except during the summer holiday when the Academy is closed, and it does not then take as long a vacation as does the general membership of the Academy.

With the activities of the Public Health Committee many of the members of the Academy are familiar; it will do no harm, however, to briefly restate the extent of these activities.

For the year 1924 the following is a brief list:

1. The report on The Hospital Situation in Greater New York was published by G. P. Putnam's Sons and has been uniformly well received and favorably commented upon.

2. The collecting of data on the Child Health Study has been completed, and a preliminary report presented at the meeting of the Academy. This brief report was published in Better Times

and *The Nation's Health*, and several hundred reprints were distributed on request.

3. A summary of the study of day nurseries made in connection with the Child Health Study was prepared and at the request of the Association of Day Nurseries of New York City was published in their annual report.

4. A conference was held with trustees of the larger convalescent homes, at which the conclusions of the study made by the Committee were presented. The whole situation was discussed at length, and the conference voted to request the Public Health Committee to formulate standards for the guidance of the convalescent homes. In accordance with this resolution, four sub-committees were appointed, and the work of formulating standards is under way.

5. The findings of the hospital study have pointed out the need of expanding the provisions for the care of patients suffering from chronic diseases. Conferences on this subject were held with Dr. Boas and the Commissioner of Public Welfare. The latter has followed the suggestion of the Committee, and has taken the matter up with the medical boards of the hospitals on Welfare Island.

6. With the co-operation of the New York Tuberculosis Association and the State Department of Labor, a course of twenty-four lectures was organized by the Committee, designed especially for physicians, but a large number of nurses and social workers also attended the lectures. Many favorable comments were made on the course, and some of those attending the lectures suggested that a similar course of lectures should be held annually at the Academy.

7. At the suggestion of the Committee, the Sanitary Code of the State was amended to require health safeguards in the construction and operation of summer camps.

8. The Committee was called up to suggest to the Municipal Civil Service Commission medical examiners as well as the type of examination to be given for the several branches of the Municipal Civil Service where physicians are employed.

The following subjects have also claimed a great deal of time and attention of the Committee during the year:

1. The needs of municipal hospitals in the way of additional new buildings and replacements of or alterations to old building. 2. Internal re-organization of the Willard Parker Hospital. 3. The autopsy situation. 4. X-ray and radium therapy in cancer. 5. Dental clinics in the schools. 6. Drug addiction. 7. Training of nurses. 8. The employment of nurse anaesthetists. 9. Food handlers examined for typhoid, etc. 10. The typhoid fever situation. 11. Control over radio broadcasting of health talks. 12. Chlorine treatment of colds. 13. Pollution of air by automobile exhaust gas. 14. Odors from automobiles, reduction plants and meat packing houses, and smoke. 15. Medical school inspection. 16. Consolidation of all municipal hospitals in one department. 17. Requests from the School Survey of the Department of Education for an opinion concerning physical standards of fitness for teachers. 18. Periodic health examinations. 19. Automobiles and other highway accidents.

Still other matters which have been before the Committee for consideration were as follows:

1. The safeguarding of Central Park against building encroachments. 2. Birth control. 3. Chiropractors. 4. The Gorgas Memorial. 5. Requests for opinion about the Knickerbocker Hospital and St. Mary's Free Hospital for Children. 6. Co-operation with the Civic Policy Committee of the New York County Medical Society. 7. The Child Labor Amendment. 8. Physiotherapy. 9. Lead poisonings. 10. Standardization of clinical thermometers.

The strength of the Public Health Committee lies in the fact that it consists of a group of men who have attained eminence in their respective fields in the practice of medicine, who consider problems pertaining to public health, hospitals, and civic policy from a purely detached angle, on the merits of each case as it arises. No one, to use a popular phrase, has an axe to grind. There is no politician in its membership and no partisanship in its deliberations or conclusions. In this it is different from almost any other public health body, which, as a rule, is composed of public health specialists who have strongly formed theories and fixed convictions regarding many phases of public health work or administration. It is to be hoped that the tradition established by the Committee as to its composition as well as its policies and

methods of work will be continued. This does not mean that it should not take an active interest in legislative matters concerning the welfare of the physician, it does mean that not only the physician but the public must be impartially considered.

Educational Activities

It is to be hoped the Academy will never undertake the teaching work that properly belongs to the university; the function of the Academy is primarily and principally to offer the medical public an opportunity to continue its education after graduation; this it does by means of its magnificent library and its meetings stated, sectional and special. Recently the Public Health Committee has organized and offered certain lectures on public health. In so far as these help the doctor to keep pace with the rapid growth of medicine the Committee would seem to be on entirely legitimate ground. Hitherto as stated, these lectures have been arranged by the Public Health Committee; it is now felt that these should be placed under the care of the Educational Committee, which should have authority similar to the Public Health Committee and be empowered to arrange post-graduate lectures on public health. This Committee should also furnish information to our own and to foreign students concerning (a) clinical facilities at home or abroad, (b) post-graduate instruction, (c) opportunities for internships, in any city anywhere. It should also encourage an interchange of internes, a phase of reciprocity which would surely promote a better understanding among the nations.

The Library Committee

The Library should and can be of greater usefulness. The medical public should be taught how to use a library. A circulation and delivery department should be arranged for so that the facilities of the library can be brought to every busy man. Exhibition of the classics and of medical engravings should be arranged from time to time. At the present moment the Trustees are bringing a scholar to the Library who will discuss some of these avenues of usefulness. The possibility of a young man or any man having an adequate library at home has grown less and

less with the growth of the city and the restriction of space. Further, the Library should be arranged so it is available to undergraduates in medicine at all times, a matter in our present condition quite impossible.

It is a source of satisfaction to note the increasing interest that is being taken in the cultural side of medicine. The great figures in medicine have nearly always been men whose scholastic attainments extended beyond the bounds of their profession, men who were students of the past as well as of the present. It seems to be the spirit of the present stage in the development of medical knowledge to emphasize too much its scientific side, and to neglect its no less important aspects as an art. That the Fellows of the Academy are not unmindful of the humanities is shown by the success of the Section on Historical Medicine, whose meetings have been productive of valuable contributions to this subject. For all investigations in these fields the Library must furnish the sources. Already containing a valuable collection of incunabula and other source books, it is the hope of the Library Committee to be able to extend this section of the Library and it earnestly requests the support and assistance of the Fellows of the Academy that additions to the material dealing with the History of Medicine may be secured.

Program Committee

The stated meetings of the Academy constitute an important part of its purpose and activities. The arrangement of programs for these meetings calls for much thought and effort. Until a little over a year ago they were arranged by the President. Since then the programs have been prepared by a special committee appointed for this purpose consisting of Drs. John A. Hartwell and Geo. B. Wallace. These gentlemen have done their work so well that I believe this plan should be continued. In order to make it a permanent one and insure a continuity of policy concerning programs, it is suggested that the Vice Presidents of the Academy constitute a program committee, of which the first Vice President shall be chairman.

As the Academy membership is made up chiefly of active practitioners of medicine, it is believed that papers read before the Academy should deal with clinical subjects or those having a

direct clinical application. Abstract or highly technical science should be presented not before the Academy, but before societies or sections especially concerned with such matters, as, for example, the Harvey Society. With the increase in number of medical societies in New York and the frequency with which meetings occur, it is not now as essential as formerly that two meetings of the Academy be held each month. One meeting a month seems to me sufficient and the arranging of high class programs would thus be made easier.

Finally arrangements should be made for paying the traveling expenses of speakers who come from a distance. It is beneath the dignity of the Academy to ask one invited to speak before it to do thus at an expense on his part. With a traveling expense fund available, the program committee would feel much less embarrassed in asking distinguished physicians from other parts of the country to take part in a program.

A suggestion as to programs might be taken from the Association for Research in Nervous and Mental Diseases. Their method briefly is as follows: The topic is decided upon a year in advance. The program committee then decides upon the subdivisions of this topic and assigns these to the men they think best qualified to write on these sub-topics. If any one declines another is selected to take his place. One month before the meeting a short but comprehensive abstract is asked from each author. These abstracts are all mimeographed and copies are sent to each member. Those at the meeting are thus better qualified to guide or take an intelligent part in the discussion which is opened.

This method of course would not always be suitable for the Academy where topics of urgent interest must frequently be taken up, but for all "chronic" and non-urgent matter it would be entirely suitable.

Finally, in relinquishing the post of President, so generously bestowed and so deeply appreciated, the retiring President wishes to emphasize his belief that no matter how great the resources of the Academy are or may become, the Academy will not fulfill its highest purpose unless it retains in the future as it has in the past the deep loyalty of its membership and the altruistic service of its officers.

ADDRESS OF THE INCOMING PRESIDENT

SAMUEL A. BROWN

I wish to express to you in assuming the duties of the responsible office to which I have been elected my sincere appreciation of your confidence and your generosity. My predecessor, who has served the Academy for a term of six years, and whose devotion and ability are well known, makes me appreciate more than ever the importance of the duties which you have called upon me to assume. I shall exert my best efforts in the interest of your Academy, and it will be necessary very often to ask for your assistance and generous indulgence. It has been customary in the inaugural address of the President to review the principals for which the Academy stands. The great tripod upon which these principals have been erected is:

1. Cultivation and advancement of the science of medicine.
2. Promotion of the character and honor of the profession.
3. The elevation of the standards of medical education.

These principles always have and always will be adhered to most tenaciously. The character of the scientific program presented during the year attests the first principle. It is hoped in the near future a fixed program committee will assume the responsibility for arranging the scientific part of the Academy activities. The Public Health Committee, under the chairmanship of Dr. Dana, has functioned most ably and has accomplished much work of great importance relating to the community and profession.

Secondly. The promotion of the character and honor of the profession. This principle will be maintained as in the past, upon the highest plane.

Thirdly. Elevation of the standards of medical education. One of the activities of the Academy which will be most extended is the work of the Committee on Education. This committee will be developed and have supervision over postgraduate courses in the city; provide information regarding educational opportunities abroad, locally and in other parts of the country; supply information to our foreign visitors and members of the profession from all parts of the United States and innumerable phases of work relating to education.

It seems to me that it is more appropriate at this time to devote my remarks to the project in which we are all so interested. It has been necessary in the development of the plans of the new Academy for the officers to make many important decisions and I feel that in some instances there have been members who are not entirely familiar with the reasons determining their decisions, and therefore think it might be advisable to present to you as briefly as possible the principal points in the plans as they have been developed up to this time. There are always differences of opinion, and, in fact, differences of opinion and constructive criticisms are most helpful, but misunderstandings often lead to unfair criticisms and lack of unity.

Before taking up the present movement for our new development I am going to ask you to go back with me to the conception of the Academy. As you know, the Academy originated in 1846 through the efforts of a group of pioneers who had vision enough to see the necessity for creating a medical organization independent of the colleges or the medical societies then established. They little knew how well they built or planned, or the rapid development, magnitude and usefulness of this organization in the civic and professional life of this city. It is interesting to note that while the beginning of this Academy occurred in 1846, there is evidence of an attempt to form a similar organization previous to this date, and I quote from an original copy of the N. Y. Medical & Physical Journal, showing that an Academy of Medicine was organized in 1826, preceding our organization by twenty years, with the following officers: Felix Fascalis, president; John B. Beck, John Watts, John Stern and Jos. M. Smith, vice-presidents; Daniel L. M. Peixotto, secretary; Samuel W. Moore, treasurer, and John K. Rogers, curator. This effort apparently never went beyond the organization meeting and the election of officers. I am indebted for this information to Mr. John S. Brownne, who has served the Academy so loyally and faithfully as librarian for many years. I mention this matter as it is of historical interest and I think never before referred to in the history of medicine in New York City. The idea of our Academy was first presented at a dinner of the Society for the Relief of Widows and Orphans of Medical Men. For a number

of years meetings of the society were held in the Lyceum of Natural History and in the building of the University of New York on Washington Square and subsequently at the College of Physicians and Surgeons, 23rd Street. From its very beginning efforts were made to provide it with a building of its own. It was not until 1875 that a building was purchased at 12 West 31st Street. This was sufficient for the needs of the Academy for a number of years, but the demands upon it for meetings and for library purposes soon made necessary the consideration of plans for additional space and efforts were made by friends and the profession to raise funds for a new building. Eventually, in 1890, this building was formally opened. It was thought that the accommodations were ample, but in a period of 15 years it became evident that facilities were entirely inadequate for the purposes and activities that had grown within its organization, and in 1909 committees were again organized to consider how best to relieve the crowding and limitations that existed in the meeting rooms and in the library. After careful consideration additional buildings were purchased to the east of the present building and on 44th Street. It was at this time that the Committee on Plan and Scope succeeded in obtaining from the members of the Academy subscriptions amounting to \$140,000. This was known as the Academy's Extension Fund. After many meetings, deliberation and consideration of plans, it was evident that the utilization of this property would be a very costly experiment and would after all only serve as a makeshift and would in no way solve or make possible the developmental plans and activities of the society. It was a matter of great disappointment to many of our members when it was necessary to give up this plan and to postpone the building of the addition. Yet, in the light of what we know, we can see the evidence of good judgment and forethought exercised by the officers and by the committee. The extension fund was invested and is now available for the purposes for which it was created. It is interesting to note that Dr. Witthaus, one of the staunch supporters of the Academy, was the first subscriber to this fund. It was not until 1923 that the matter was again put in form, when at a stated meeting of the Academy a resolution was adopted authorizing

the president to appoint a Building Committee. It was evident upon deliberate study that a large sum of money would be necessary for this purpose, and a committee under the able direction of Dr. Royal S. Haynes was organized to solicit subscriptions from the members. The efforts of this committee were remarkable in their results. Members and friends responded and liberally contributed the sum of \$531,284.05 for the project. The great response was indeed a remarkable evidence of the interest of the members in their desire to provide greater facilities for this association. Through the efforts of the officers of the Academy the aims and necessities of the situation were placed before the Rockefeller Foundation with the result that the sum of \$1,250,000 was appropriated by the Foundation for endowment and extension of the Academy activities. The Carnegie Corporation, as an evidence of their desire to help the medical profession, also offered to appropriate for a new building the sum of \$1,000,000 subject to their approval of the site and the plans for the building. We are greatly indebted to Dr. Pritchett for his personal interest, as it was largely due to his efforts that the Corporation became interested. The officers of the Academy have appealed to the Carnegie Corporation for an additional sum of \$550,000 for building purposes and have every reason to believe that their efforts will meet with success. Certain generous donors, among them Mrs. Helen Hartley Jenkins, Mr. Edward S. Harkness, Mr. George F. Baker and Mr. James B. Ford for the estate of Dr. Everett Herrick, subscribed toward the purchase of the new plot and it seemed as though all obstacles had been overcome which would in any way prevent the immediate erection of a new building. After a careful study of available properties a site was purchased at Park Avenue and 60th Street for the sum of \$754,500 and work was at once begun upon drawings and plans for the erection of the building. Further consideration on the part of the officers of the Academy soon evidenced the fact that there were many objections to the site selected, among them that the corner of 60th Street and Park Avenue was very little better in respect to congestion than the site in 43rd Street, that the amount of money which had been placed in the property was in excess of the sum that the Academy could afford to invest and that it would

have been necessary in some way to materially reduce the scope of the contemplated plans or obtain an additional \$1,000,000 for building and \$2,000,000 for endowment before the project could be consummated. Fortunately, before any serious contracts or obligations had been undertaken, an opportunity presented itself to dispose of this property at a profit, which, in view of the above objections, left no alternative but to accept it and to locate upon another site with a better understanding of the financial requirements necessary to make the undertaking a success. Once again it was a question of hunting a suitable site upon which to erect a home. Many locations were investigated and their advantages and disadvantages discussed, and eventually a property on the corner of 103rd Street and Fifth Avenue was, after a unanimous vote of the Academy, purchased by the trustees. There has been a considerable criticism about the selection of this property, principally because of its geographical location, but I think that with all the facts before you, you will agree that it was a wise and proper selection on the part of your officers. First, from its position opposite the park, perpetual light was assured; second, it was in a district that would permit an easy approach and was free from many of the disadvantages of traffic; third, the property was almost double the size of the one at 60th Street, being 175 feet by 100 feet as compared with 100 by 100 in the former location; fourth, it was possible to purchase this property for the sum of \$225,000, thus making available for endowment and equipment the sum of \$613,000 which had been invested at 60th Street; fifth, with the moneys appropriated by the Rockefeller Foundation, the gift of the Carnegie Corporation, the generous gifts of friends of the Academy, subscribed by members, equity in the 43rd Street property and other assets of the Academy, all go to make practicable the erection of a building and the provision for an endowment which will care for the activities as contemplated in the development of our proposed expansion. Otherwise the present plans would have been delayed indefinitely by reason of the necessity for raising more money. The objections to the site as presented by some of the members were that it was too far uptown and not easily accessible. This, at first sight, seems a fair criticism, yet when we study the rapid growth

and development of New York, who can predict what changes will occur in this vicinity within the next ten years? It is readily reached by the transportation lines on Lexington and Madison Avenues, both surface and subway, with a station at 103rd Street; by the Fifth Avenue buses, a street available for motor transportation, and is also within reasonable distance of cross-town lines. Therefore, it does not seem that there is the slightest question but that the decision of the Academy and your officers was a judicious and proper one. There will be erected on this site a building which will be a monument to the generosity of the Carnegie Corporation, Rockefeller Foundation, the profession and friends of the profession, that will amply house all of the activities of the Academy now organized or to be organized and provide meeting rooms for the Academy, associated societies, the Public Health Committee, the Education Committee, a library ample in size to accommodate 327,000 volumes and provisions for future expansion, and many other lines of work now under consideration and contemplated by the trustees and council.

Let us for a moment make an inventory of our future possibilities. If we obtain the additional appropriation for building we will come into possession of a building costing one million and a half, the gift of the Carnegie Corporation, equipped at an expense of about \$175,000 by the Academy on a plot costing \$225,000 provided by generous friends, and would have for endowment, including the Rockefeller Foundation gift, a sum approximating two and a half millions. This estimate must necessarily be approximate because the equity in the 43rd Street property cannot be determined until a sale has been made, and until the Carnegie Corporation has arrived at a definite decision.

We therefore must, I think, be congratulated upon the consummation or practical consummation of plans for which we all have been striving these many years, and it is my hope that the understanding of these facts will bring about a closer relationship between the officers and the members of the Academy. Dr. Duel, who as chairman of the Building Committee has devoted a great deal of time to the study of the plans, will make a detailed report a little later.

In conclusion, I must beg your indulgence and become somewhat personal. The retiring president, Dr. George D. Stewart, who has guided the destinies of the Academy with the assistance of the trustees and council for six years, and who during that time has been called upon to decide many momentous and serious questions of policy, has given much of himself in order that we might benefit, and if, during my incumbency of office, we will be privileged to see the erection of a new building, it would seem to me but fair to state that anything that we may accomplish will be but the completion of the plans which he and his associates have so carefully developed, and for which we all, as members, are deeply indebted.

REPORT OF THE BOARD OF TRUSTEES

During the year 1924 the Board of Trustees has held eight regular meetings and in addition seventeen special meetings. During the winter of 1924 a large amount of time was given to the finances of the Academy, especially in regard to the proposed new building. The plans for the proposed building at 60th Street and Park Avenue called for an expenditure of over \$2,000,000. The Carnegie Corporation, which had already appropriated \$1,000,000, did not feel able to increase its appropriation sufficiently to construct a building of the type called for. A re-study of the needs of the Academy was made and although it was found that a smaller building could be constructed on the 60th Street site, it was considered more desirable to secure if possible a larger plot and at a considerable less expense than the one at 60th Street. The 60th Street plot had been bought by the Academy for \$754,500, upon which were unpaid mortgages, amounting to \$141,000. The Trustees finally decided that the wiser solution of the problem was to sell the 60th Street plot, and recommended this procedure to the Fellows of the Academy, which recommendation was unanimously approved by the Fellows present and voting at a stated meeting held on May 1, 1924. This property was finally sold for the sum of \$1,000,000—\$500,000 of which has already been paid. The balance remains in a mortgage on the property, which is steadily increasing in value as a building is now being constructed on the plot.

Before the 60th Street property was sold the Trustees made a most careful search of all properties in the city which seemed available for the Academy needs. Such sites are not easily obtained and over one hundred were considered and studied before the Trustees finally determined that the lot at 103rd Street and Fifth Avenue was suitable to the Academy needs and the Academy approved of the acquisition of this site, which was finally purchased for \$225,000. The Trustees feel that the Academy is very fortunate in having made this change, as a number of the Board were quite fearful of the enormously increased expenditure for maintenance which will naturally result when the Academy is installed in a new building. Although it is known that a number of the Fellows of the Academy feel that this site is somewhat inaccessible, the Trustees are convinced that this decision will be for the best interests of the Academy. The difference in the cost of the land will enable the Academy to add to its endowment, which will materially aid in the maintenance of our new building and new activities.

The Trustees decided during the year to change the fiscal year of the Academy, which has been from November 1 to October 31, to the calendar year, January 1 to December 31. A number of years ago the fiscal year was changed so that financial reports could be prepared in time to present them to the Academy at its January meeting. It is now found that by a rearrangement of the work it will be possible to present such reports in January even if the fiscal year is the same as the calendar year.

The income and expenditures of the Academy will be given in detail in the report of the Treasurer, but attention is called to the fact that the total receipts of the Academy for the fourteen months ending December 31 amounted to \$149,431.31 and the expenditures amounted to \$155,523.02, leaving a deficit of \$6,091.71. We owe to restricted funds \$20,159.85, leaving an actual deficit at the end of the fourteen months of \$26,251.56.

At the present time the funds of the Academy as invested in the General Permanent Fund, the Endowment Fund, the Library and other restricted funds are as follows: There are invested in first mortgages on New York City real estate \$898,500, in bonds of a par value \$550; and in the real estate of the Academy at

15, 17, 19 and 21 West 43rd Street, 103rd Street and Fifth Avenue, and at 222 East 83rd Street, \$616,926.59.

There have been a few changes in staff during the past year, the most important of which has been the appointment of a Director who is giving an increasing amount of his time to Academy affairs and in particular to the plans for the construction of the new building. The work of the Librarian and his staff and that of the various employees in the building has been most satisfactorily performed throughout the year.

CHARLES L. DANA, *Chairman*

ABSTRACT OF THE TREASURER'S REPORT FOR 14 MONTHS ENDING DEC. 31, 1924

ASSETS AND LIABILITIES

Assets

Cash in Banks:		
Income of Funds	\$ 1,691.56	
Principal of Funds	17,008.06	
	<hr/>	18,699.62
Cash in Office		10.00
Investments:		
Bonds and Mortgages		899,050.00
Real Estate:		
17-19-21 W. 43rd St.	284,426.59	
15 W. 43rd St.	100,000.00	
222 E. 83rd St.	7,500.00	
5th Ave.-103rd St.	227,548.58	
	<hr/>	619,475.17
Library		80,000.00
Estate of Dr. Charles A. Powers		1,513.98
		<hr/>
		1,618,748.77
 <i>Liabilities</i>		
Principals of Trust Funds		894,291.27
Principals of Other Funds:		
Academy Extension Fund	133,908.88	
New Site Fund	495,096.55	
	<hr/>	629,005.43
Mortgages, 17 West 43rd Street		100,000.00
Prepaid Dues		30.00
		<hr/>
		1,623,326.70
Less deficit:		
Unexpended Income, Library . .	1,701.63	
" " Special Fds. .	18,458.22	
	<hr/>	20,159.85
Less Academy Deficit	24,737.78	
	<hr/>	4,577.93
		<hr/>
		1,618,748.77

SUMMARY OF ANNUAL STATEMENT

Income

Unrestricted	\$ 56,629.83	
Restricted:		
Petty Cash	10.00	
Holt Tablet Fund	596.64	
		\$ 57,236.47
Carnegie Architects'		13,021.55
Library Funds		14,429.38
Public Health Committee		15,849.03
Rockefeller Appropriations:		
Direction		11,377.95
Survey, etc.		5,000.00
Bureau of Information	11,592.08	
Carnegie (Med. Educ. Soc.)	15,186.00	
Bulletins	1,319.25	
		28,097.33
Carpenter Lectureship Fund		361.65
Gibbs Prize Fund		3,161.85
Loomis Entertainment Fund		896.10
Charles A. Powers Legacy		
		\$ 149,431.31

Expenditures

Operation, Administration, Corporation Expense	\$ 60,631.35
Architects' Fees	13,021.55
Library	34,070.45
Public Health	15,849.03
Direction	8,787.75
Survey	2,914.47
Committee on Medical Education, Bureau of Clinical Information	15,261.97
1924 Carpenter Lecture	312.15
Gibbs Fund (Transferred to principal)	2,445.32
Collations	715.00
Inheritance Tax Powers' Legacy	1,513.98
	\$ 155,523.02
Expenditures	155,523.02
Income	149,431.31

\$ 6,091.71

Owed to Restricted Funds:

Rockefeller Revolving Fund	\$ 2,590.20
" Survey Fund	2,085.53
Carnegie Med. Educ. Fund	12,835.36
Gibbs Prize Fund	716.53
Carpenter Lectureship Fund	49.50
Loomis Entertainment Fund	181.10
Library Funds, unexpended income	1,701.63
	20,159.85

\$ 26,251.56

Less prepaid on Powers Legacy 1,513.98

DEFICIT \$ 24,737.58

SETH M. MILLIKEN,
Treasurer.

REPORT OF THE HISTORICAL SECRETARY

I have the honor to present the following report, as Historical Secretary, for the year 1924:

During the year, the following organizations have maintained their offices in the Academy buildings:

Committee on Dispensary Development.
 Hospital Information Bureau.
 Medical Society of the County of New York.
 Medical Society of the State of New York.
 Physicians' Mutual Aid Association.
 Society for the Relief of Widows and Orphans of Medical Men.

Meetings have been held in the Academy buildings by these organizations:

American Association for Regional Anesthesia.
 American Proctologic Society.
 American Urological Association, New York Society.
 Association of Italian Physicians of America.
 Associated Out-Patient Clinics.
 Beth Israel Hospital Examination.
 Children's Welfare Federation Annual Meeting.
 Committee on Maternal Health.
 Dental Hygienists' Association.
 Eastern Medical Society of the City of New York.
 Educational and Efficiency Society for Dental Assistants.
 First District Dental Society, General and Sections.
 German Medical Society.
 Good Samaritan Dispensary.
 Hunterian Medical Society.
 Manhattan Dermatological Society.
 Medical Association of the Greater City of New York.
 Medical Society of the County of New York.
 Medical Society of the County of New York, Public Health
 Education Committee Lectures.
 National Tuberculosis Association.
 New York Academy of Dentistry.
 New York Dermatological Society.
 New York Electrotherapeutic Society.

New York Neurological Society.
 New York Pathological Society.
 New York Pathological Society, The Middleton-Goldsmith
 Lecture.
 New York Roentgen Society.
 New York Society for Anesthetists.
 New York Society of Clinical Psychiatry.
 New York Society of Graduates in Medical Gymnastics and
 Massage.
 New York Society for Thoracic Surgery.
 New York Surgical Society.
 New York Tuberculosis Association.
 New York Veterinary Medical Society.
 Phi Delta Epsilon Fraternity.
 Society of Medical Jurisprudence.
 Womens' Medical Association of New York City.
 Yale in China, Dr. Hume's Lecture.

Accommodations, free of charge, have been granted during the year to:

Committee on Narcotic Drugs.
 Dr. Harris' Health Department Lecture.
 The Harvey Society.
 Manhattan State Hospital, Board of Managers.
 Medical Board, Montefiore Home and Hospital.
 Memorial Meeting, Dr. Hermann M. Biggs.
 New York Heart Association.
 New York State Board of Medical Examiners.
 Public Health Committee, Lectures on Tuberculosis and Industrial Hygiene.

The following gifts, other than books, were received:

From Dr. Maurice Oliver Magid—Seven plaques of former prominent physicians.
 From Dr. DeWitt Stetten—Casts from case of idiopathic progressive curvature of the radius, or so-called Madelung's deformity, reversed or backward type (carpus valgus).
 From Dr. Reginald H. Sayre—An old microscope, Clarks hydrometer, six framed pictures.

From Dr. Victor C. Pedersen—Group photograph (framed).

During the year the following members of the Academy have died:

FELLOWS:

Clinton Levi Bagg	Selian Neuhoﬀ
Henry A. Bernstein	Joseph H. O'Connell
James Bishop	Charles Edwin Perkins
George F. M. Bond	T. Mitchell Prudden
B. Farquhar Curtis	Eugene C. Savidge
R. Condit Eddy	Thomas Allison Smith
Gustav G. Fisch	Robert Edward Soule
L. Emmett Holt	Edwin Sternberger
James Albert Honeij	Brandreth Symonds
Edward L. Keyes	Horace S. Stokes
Malcolm McLean	E. Clark Tracy
James Franklin Nagle	William Westerfield
George Stuart Willis	

ASSOCIATE FELLOWS:

Henry J. Bogardus	Henry B. Boucher
Philander A. Harris	

Respectfully submitted,

CHARLES M. WILLIAMS,
Historical Secretary.

REPORT OF THE COMMITTEE ON LIBRARY

The past year has been a somewhat difficult one for the Library, but it closes with the assurance of better times to come. The condition of the Academy's finances has made the most rigid economy compulsory for the Library Committee, and during the past twelve months there has been a considerable reduction in the amount spent on the Library. In 1923 the expenditure for the Library, exclusive of salaries, was \$19,171.83, but in 1924 this was cut down to \$14,739.63. This saving could be effected only at the cost of curtailing essential expenditures, such as for new books, of which only 1941 could be purchased as opposed to 3077 bought during 1923, and for binding, for in 1924 only

\$3,705.80 could be spent for binding, while in 1923 the corresponding amount was \$6,103.60.

The enforced economy in the latter respect has had deplorable consequences, for the use of the volumes of periodicals in the unbound condition has resulted in disastrous wear and tear of the numbers, which in many cases will have to be re-ordered and paid for.

Owing to the smaller number of new books purchased, the time that otherwise would have been spent in cataloguing, accessioning, and shelf-listing these has been employed by the librarians in the highly necessary task of going over and arranging the accumulation of old theses and volumes of bound pamphlets. These latter have all been carefully looked over, and are either catalogued and put on the shelves, or, where desirable, the volume is separated and the single pamphlets are placed in the pamphlet boxes. The very valuable collection has been increased this year by more than 6,000 pamphlets.

A very useful feature of the library work this year has been the publication of a list of current periodicals on file in the Library, which appeared in March. Instead of following the old arrangement of listing by languages, all titles are included in a single alphabet in accordance with modern practice, and the list has received much favorable comment.

An activity that was discontinued four years ago for lack of funds is the revision of the shelf list. The current material is shelf-listed, but it is very desirable that an additional cataloguer be employed to carry on the work of revision.

The overcrowding of the stack rooms, to which attention has been called for several years past, has been dealt with by covering the side walls and windows with shelves. New shelving to the total of 1480 feet has already been added to the stacks, and every available space will be covered with shelves by the first of the year. This has entailed an enormous amount of shifting, which is still going on, and is being effected in such a way as to leave a little room for expansion in the sections of books that grow most rapidly, such as endocrinology, diabetes, metabolism, and dietetics. The crowding, however, is still a serious matter in the sections devoted to the periodicals, and the librarians are anxiously looking forward to the removal to the new building, for at the

normal rate of increase in less than two years the floors will be covered as well as the shelves, and the operation of the library will be made increasingly difficult.

Unfortunately it is necessary, as in previous years, to call attention to the fact that mutilation of books and of periodicals continues. This is an evil that appears to prevail in all libraries in spite of every effort to suppress it.

Inasmuch as the special library funds are wholly inadequate for the expenses of the Library, it is the hope of the Committee that a different method of accounting may be adopted by means of which the library account shall be incorporated as a part of the general Academy expenses, and the library be relieved of the necessity of over-drawing on its funds. There is no activity of the Academy more important or more useful than the maintenance of the Library, and its support should be provided for in such a way as to enable it to carry on its functions with all the freedom possible. In numerous ways its facilities could be made more generally available, such as by the establishment of a bibliographic service, by the installation of a photostatic outfit, and by the institution of a delivery and call system, and the Library Committee is considering various other plans by which the Library can be made more useful on removal to the new building, if not before. The Library Committee is anticipating the erection of the new building, and has devoted much time to a study of the plans, and of the opportunities for making the new Library the finest and best arranged medical library in existence. Numerous conferences have also been held with the Director of the Academy on the important subject of the selection of a librarian for the new Library, and several possible candidates have been interviewed, and the advice of specialists in this field has been obtained.

The Committee desires to record its appreciation of the welcome assistance it has received in its work through the co-operation of the Director of the Academy, whose presence at meetings of the Committee has been of the greatest value.

The following budget is submitted as representing the needs of the Library for 1925. For purposes of comparison the sums actually spent in 1923 are also given. The expenditures for 1924 cannot be used as a basis for determining the requirements for

1925, since, as has been pointed out above, 1924 was an abnormal year in which enforced economy curtailed many essential expenditures, and in consequence these deficiencies in back binding, purchases of books, completing files, etc., will have to be made up, and will increase the Library costs for 1925. Important and much needed items are a new pamphlet case and a fireproof safe for the cards comprising the very valuable accession list.

	1923	1925
1. Bookbinding, current journals and books.....	\$4,774.25	\$ 5,500
2. Bookbinding, back volumes	1,329.35	2,400
3. Completing files	642.33	1,000
4. Current periodicals	6,494.68	7,000
5. Current books	5,184.34	6,000
6. Supplies and sundries	746.88	800
	<hr/> \$19,171.83	<hr/> \$22,700

STATISTICAL REPORT

The following donors gave more than 20 books each :

Dr. W. J. Robinson	Dr. Edw. L. Meierhof
Dr. B. W. Hamilton	Dr. M. H. Brown
Wm. Wood & Co.	Dr. Arthur Stein
Dr. S. N. Irwin	Miss Prudden
Dr. B. W. Weinberger	Dr. Arthur A. Landsman
Dr. C. G. Childs	Dr. Harmon Smith
Dr. Thomas E. Satterthwaite	Dr. Bernard Hughes
Estate of Dr. W. L. MacFarlane	Dr. Walter M. Brickner
Dr. Henry W. Schimpf	Dr. H. S. Shulman
Dr. G. W. Schneider	Dr. Fielding L. Taylor
Dr. Edward D. Fisher	Dr. De Witt Stetten
Woman's Hospital	Dr. Reginald H. Sayre
Dr. M. J. Schoenberg	Dr. M. M. Stark
Dr. Isador Goldstein	Dr. Florence M. Loughton
Dr. W. S. Thomas	Mrs. J. Leonard Corning
Dr. Lester Mead Hubby	Dr. Eli Mosehcowitz
Mrs. M. M. Huber	Mrs. McCarthy
Dr. M. W. Raynor	Dr. D. Bryson Delavan
Dr. John B. Walker	Dr. S. M. Payne
Dr. Wm. K. Draper	Dr. Alfred G. Langmann
	Dr. Wm. L. Stowell

The following publishing houses have also, according to their custom, kindly donated volumes from their presses:

D. Appleton & Co.	25	Paul B. Hoeber	3
Bauer & Black	1	Merek	1
Boericke & Runyon	1	Modern Hospital Publishing Co.	1
Burroughs, Wellcome & Company	1	W. F. Prior Co.	1
Carnrick	1	W. B. Saunders Co.	48
Funk & Wagnalls	15	Wm. Wood & Co.	1

The Library has also benefited by appropriations from the First District Dental Society during the fiscal year, amounting to \$250, which with a credit from the previous year of \$106.30, brought the total available balance to \$356.30. After deducting bills payable, a credit of \$136.70 remains.

The following statistical report is submitted:

A. Books.

Books added from November 1, 1923, to October 31, 1924 inclusive	3,362
Books and periodicals bought by income from special funds	1,859
Books and periodicals bought by appropriation (accessioned)	82
Books donated by publishers	186
Books donated by members and societies	1,235

A2. Total number of books (not including duplicates) October 31, 1924 134,185

Total number of pamphlets:

Number of pamphlets accessioned	94,929
Pamphlets catalogued and accessioned during year	6,422

We are now receiving regularly periodicals as follows:

American	542	Italian	92
British	177	Spanish	67
French	154	Other languages	64
German	333		

Total 1,429

B. Circulating Department.

1918	3,337 books and pamphlets, (2,428 books) (908 pamphlets)	1,728 journals, issued 2,665 times to 540 members, publishers and other libraries.
1919	3,192 books and pamphlets, (2,336 books) (856 pamphlets)	1,825 journals, issued 2,677 times to 556 members, publishers and other libraries.

1920	4,191 books and pamphlets, (3,081 books) (1,110 pamphlets)	2,264 journals, issued 3,455 times to 634 members, publishers and other libraries.
1921	4,527 books and pamphlets, (3,311 books) (1,216 pamphlets)	3,105 journals, issued 4,170 times to 677 members, publishers and other libraries.
1922	4,284 books and pamphlets, (3,350 books) (934 pamphlets)	2,955 journals, issued 3,961 times to 689 members, publishers and other libraries.
1923	4,175 books and pamphlets, (3,197 books) (978 pamphlets)	3,172 journals, issued 3,885 times to 696 members, publishers and other libraries.
1924	4,432 books and pamphlets, (3,302 books) (1,130 pamphlets)	3,681 journals, issued 4,293 times to 720 members, publishers and other libraries.

C. *Reading Room.*

			Holiday and Sunday readers		
1915	26,400 readers	1918	18,375 readers	1918	520 "
1916	27,203 "	1919	23,500 "	1919	620 "
1917	24,750 "	1920	27,475 "	1920	776 "
		1921	34,290 "	1921	768 "
		1922	31,160 "	1922	541 "
		1923	29,700 "	1923	526 "
		1924	27,400 "	1924	587 "

D. *Bookbinding.*

Total number of volumes bound.....	1,542
Cost of such binding.....	\$ 3,705.80

E. *Finance.*

Expenditures from Special Library Funds and Appropriation:

Bookbinding, current journals and books.....	\$ 3,134.90
Bookbinding, back volumes.....	570.90
Completing files	126.45
Current periodicals	6,863.29
Current books	3,982.34
Supplies and Sundries	61.75
Salaries	13,538.79
Total	\$28,278.42

26,100 cards have been used for the catalogues.

F. *Growth of the Library.*

The additions to the Library, which have been accessioned since 1915 during the last ten years, are as follows, exclusive of duplicates:

1915	3,679	volumes and	3,315	pamphlets
1916	3,911	"	"	3,372
1917	3,136	"	"	3,588
1918	2,697	"	"	3,794
1919	2,468	"	"	4,355
1920	4,614	"	"	615
1921	5,000	"	"	2,259
1922	2,976	"	"	4,389
1923	4,416	"	"	5,739
1924	3,362	"	"	6,422

Since the last report there have been 633 cards issued for the use of the Library during afternoons and evenings.

There are 21 annual Library Subscribers registered in 1924.

Respectfully submitted,

KARL M. VOGEL,
Chairman.

REPORT OF THE COMMITTEE ON ADMISSION

The Committee on Admission of the Academy submits the following statistical report for the year 1924:

Candidates recommended to Fellowship, 48.

Candidates recommended to Associate Fellowship, none.

The names on the Waiting List as of December 31st, number one hundred and fifteen.

Respectfully submitted,

J. BENTLEY SQUIER,
Chairman.

BRIEF SUMMARY OF THE ACTIVITIES OF THE PUBLIC HEALTH COMMITTEE OF THE NEW YORK ACADEMY OF MEDICINE FOR THE YEAR 1924.

A very early constitution of the New York Academy of Medicine provides for the promotion of public health as one of the four activities of the Academy. In 1852, a standing committee on public health was created and in 1858 it was superseded by a section on public health and legal medicine, which existed until April 26, 1911, when it was in turn superseded by the present

Public Health Committee. This Committee was first known as the Public Health, Hospital and Budget Committee. As the original name implied, it was the successor of three distinct bodies of the Academy, the Public Health Section, the Committee on Municipal Budget and the Committee on Hospitals. The Committee as constituted in April 1911 consisted of Dr. Charles Loomis Dana as Chairman, Dr. James Alex. Miller as Secretary, Dr. Hermann M. Biggs, Dr. John W. Braunan, Dr. Algernon T. Bristow, Dr. Robert J. Carlisle, Dr. Arpad G. Gerster, Dr. S. S. Goldwater, Dr. L. Emmett Holt, Dr. John H. Huddleston, Dr. Abraham Jacobi, Dr. Theodore C. Janeway, Dr. Samuel Lloyd, Dr. W. Gilman Thompson, Dr. Linsly R. Williams, and E. H. Lewinski-Corwin, Ph.D., as Executive Secretary.

Through the work carried on consecutively for fourteen years, the Committee has become an important educational factor in and outside of the Academy. The Whole Committee meets once a month and the Executive Committee once a week throughout the year, excepting during the summer months. Hitherto the expenditures of the Committee have been met chiefly through the contributions made by the friends of the Academy. It is remarkable how much constructive work has been achieved with the limited financial resources which have been at the Committee's disposal since the inception of its work. In addition to the many requests which come to the Committee for counsel and opinion, the Committee has carried on a number of important surveys and studies, for some of which special appropriations have been secured from Foundations. These studies as well as other publications of the Committee have received world-wide recognition, and there has been a heavy demand for them. Some of the publications are now out of print.

The Committee's surveys and studies have resulted not only in a better understanding of the problem under consideration, but have also led to important changes in policy organization in the domains surveyed.

During 1924 the report of the Hospital Survey of Greater New York has been published in book form by G. P. Putnam's Sons, and all the comments in the numerous letters which have been received as well as in the printed reviews emphasize the con-

structive value of this book. A few of the excerpts from the reviews may give an idea of the reception accorded to it:

From "The Hospital and Health Review," London, December, 1924.

"The interest and value of this report to the British reader lie not in the fact that it is what it purports to be, a survey of the hospitals in New York, though that would invest it with both those qualities for many, but that, by reason of the breadth of view with which the topics dealt with are treated, it is very much more. It might well be described as a systematic and comprehensive general study of important hospital questions. The range of subjects of which it treats is so wide, the manner in which each in turn is approached, investigated, and discussed is so admirable in its soundness, orderliness and thoroughness; in short, the whole book, alike in matter and method, is so excellent and of so wide an application that we strongly recommend it. It is worthy not only of perusal but of study by everyone who takes an interest in hospital questions."

From "The Journal of the American Medical Association," Chicago, Nov., 1924.

"This is a splendid survey of existing hospital facilities in New York. It contains much practical knowledge about running hospitals. An historical sketch carried the reader down through the various stages of development to the present. The object of the survey was to ascertain the existing hospital services in the metropolis, to analyze their excellent points and defects, and to make suggestions for improvements. Besides the data covering the hospital situation in the metropolis, there is included a vast amount of well chosen information that is of general interest, especially the chapters on the problem of illness, hospital finances, records, and other subjects that concern hospital administrators everywhere."

From "Medical Journal and Record," New York, September 17, 1924.

"A careful perusal of the book will throw light on many matters, and should provoke much stimulating thought.

"The book is well printed and bound and has many interesting illustrations and graphs."

From "The British Medical Journal," London, December 13th, 1924.

"There is a final chapter on a 'community policy' which is most illuminating, and would serve as a text for a discussion on the hospital problem in this country equally well. The book is a fine piece of work, clearly written, restrained and balanced in statement, and amply documented by facts and figures."

Among the subjects that came within the purview of the work of the Committee during the past year were the following:

1. *Convalescent Facilities.* The lack of standards for the proper utilization and development of institutional convalescent facilities has prompted the Committee to attempt the task of formulating such standards. Four special sub-committees are at work on this problem, which has been taken up jointly with the Hospital Information Bureau.

2. *Hospital Provision for Chronics.* The neglect of the "chronic" is one of the outstanding shortcomings of the hospitalization policy of this city. The existing facilities are insufficient both as to numbers and quality of service.

A program for the care of those suffering from "degenerative diseases" has been part of the work of the Committee during the past year.

3. *Nursing.* The evident ill-adjustment of nurse training to the demands for bedside nursing service is universally recognized. Consideration was given to the problem from various angles, and particularly that of supplying the needs of home nursing care.

The Committee made a special recommendation for the training of nurses for the care of tuberculous patients.

4. *Needs of Municipal Hospitals.* The Committee went on record in support of the requests of the Commissioners of Public Welfare and Health and the trustees of the Bellevue and Allied Hospitals for certain appropriations in connection with structural changes and additions to the present hospital buildings, and for the improvement of facilities for the Psychopathic Service and the New Dispensary at Bellevue Hospital.

5. *Contagious Disease Hospitals.* The Committee has been in close touch with the efforts which are being made toward the improvements of the organization and management of the contagious disease hospitals, particularly that of the Willard Parker Hospital.

6. *Industrial Hygiene.* The importance of recognition by physicians of so-called industrial diseases has been stressed by the Committee. A course of lectures on the subject was held in the Academy under the joint auspices of the Public Health Committee, the Division of Industrial Hygiene of the New York State Department of Labor, and the New York Tuberculosis Association. At the Committee's suggestion the Division of Industrial Hygiene of the New York State Department of Labor published a manual, which is of value to every physician in diagnosis as well as in prophylaxis.

7. *Post-Mortems.* The Committee has formulated a bill amending the Cadavers Law, which would remove some of the obstacles in the way of performing more post-mortems in the hospitals. It has been long recognized that archaic and obsolete laws on our statute books are a hindrance to medical progress.

8. *Drug Addiction.* The Committee has made several suggestions concerning legislation on the subject, as well as studies concerning the amount of habit-forming drugs used for medicinal purposes in this country.

9. *Pollution of City Air.* Data bearing on pollution of the air from dust, soot, smoke, odors and automobile exhaust gas have been gathered by the Committee and conferences have been held with City officials, with representatives of civic agencies and engineering societies.

10. *Control over Broadcasting.* Recognizing the value of radio broadcasting as a medium in the dissemination of information pertaining to health and medical matters, the Committee co-

operated with the Health Speakers' Bureau of the Health Education Council of New York.

11. *Prevention of Typhoid Fever.* The Committee took an active interest in the efforts of the Department of Health to deal with the typhoid fever outbreak in the autumn of 1924, as well as in its efforts to eliminate carriers from among those engaged in the handling of food. Recommendations have been made concerning the best use of the present Sanitary Code requirement with regard to the periodic medical examination of food handlers.

12. *City Budget.* In accordance with the custom of former years the Committee analyzed the budget estimates of the Departments of Health, Public Welfare, and Bellevue and Allied Hospitals. There has been no material departure from the preceding year, in the budgets of the three departments in question, except that the Department of Health since 1920 has been requesting and obtaining in addition to the regular budget special supplementary appropriations. The Committee felt that it would be desirable from the point of view of policy as well as of organization for the Health Department to discontinue requests for emergency appropriations and to enlarge the regular staff of the Department, if the exigencies of the service demand an increase in personnel.

13. *Miscellaneous.* Among other matters which claimed the attention of the Committee were treatment of colds by chlorine gas, medical inspection, the dental clinics in schools, the reduction of highway accidents, amendment of the marriage laws, and numerous other bills which have been introduced in the Legislature. Among the measures which were opposed by the Committee, was an amendment to the Criminal Code, proposed by the Committee of Fourteen, which would declare a man found with a prostitute to be a vagrant and to be dealt with accordingly by the Courts.

The Committee was represented on various public conferences and assemblies.

Respectfully submitted,

CHARLES L. DANA,

Chairman.

REPORT OF THE COMMITTEE ON MEDICAL EDUCATION

At a joint meeting of the Society for the Advancement of Clinical Study and the New York Association for Medical Education, held October 18, 1923, it was resolved that if the Academy of Medicine concurred, the work of the two organizations should be joined together under the direction of a Committee on Medical Education of the Academy. A resolution was adopted by the Council of the Academy at its meeting in December approving this action. A Committee on Medical Education was thereafter appointed, consisting of the members of the governing bodies of the two organizations, and an Executive Committee composed of 14 Fellows of the Academy with Dr. Chas. N. Dowd as chairman.

The first meeting of the Executive Committee was held on March 4, 1924. Sub-committees on qualifications and on post graduate instruction were appointed. The activities which the Committee decided upon to at once take up were much the same as those which were announced and carried on by the two organizations which had just been merged. They included plans for the maintenance of a bureau where information in detail should be kept of all graduate opportunities offered in greater New York as well as elsewhere in the United States and in foreign countries; this information to be made available for medical men who might make inquiry in person or by letter. Contact with the courses as carried on was to be kept up, in order that the Committee might be advised of the manner in which they were conducted, the qualifications of the teachers, the adequacy of the material and equipment, and so forth. The need of additional special internships or residencies for training in the specialties was to be made a subject for study. Another possibility believed to be worthy of investigation was a correlation between the different medical schools and the development of long courses in the clinical specialties in which some of the fundamental laboratory work might be given at the schools, and the clinical work in hospitals which might or might not be affiliated with medical schools.

Much information concerning graduate medical opportunities in New York and in other medical centers of the United States and abroad, has been collected, arranged and classified, and is now available for the use of the Committee and to meet inquiries.

Visits have been made by the Medical Secretary to Philadelphia, Chicago and Boston for the purpose of gathering information at first hand and consulting with the Deans of graduate medical schools and others concerned with the status of graduate medical education in other localities in this country.

In June sub-committees were appointed composed of Fellows of the Academy generally recognized as specially qualified in their particular subjects, to investigate and report upon courses offered in New York. These sub-committees have been actively engaged in the work and with one or two exceptions have already presented their reports.

Based upon these reports a synopsis is being prepared which will show the opportunities for graduate medical study offered in New York which have been approved by the Committee on Medical Education. The Committee has decided that the synopsis should at first be published in the form of separate pamphlets dealing with each clinical subject.

The subject of special internships or residencies which are available in New York is now being studied by the Committee. Approved opportunities of this nature will be announced in the synopsis in connection with the courses which are offered.

Upon recommendation of the sub-committee on qualifications the Committee decided that the privilege of posting on the daily Bulletin of Surgical Clinics should be restricted to those hospitals which have met the minimum standard of the American College of Surgeons. Seven hospitals were adversely affected by this action and were so notified. These hospitals are: in Manhattan,—Central Park West, Midtown, Tonsil; and in other Boroughs,—Lutheran, Unity, Williamsburg and Dr. Wade's. A list of the hospitals now posting is herewith attached.

During the year the Bulletin was published daily without interruption. It has been enlarged in size and its form and nomenclature have been considerably improved. The increase in daily average of hospitals, surgeons and operations posted is indicated by the following figures:

	1924	1923
Hospitals	29	20
Operations, etc.	171	110
Surgeons	89	50

The subscription list numbers 278. Transient recipients average twelve a day.

The weekly *Bulletin of Medical Clinics* has appeared every week since October 12, with the exception of Dec. 29, when the Christmas holidays interfered with the routine work of many of the hospitals. Increasing difficulty has been experienced in securing from the hospitals their programs in time for the copy to go to the printer. Subscribers to the *Bulletin* number about 500, a large majority of whom are not Fellows of the Academy.

A total of 436 visitors have called at the Bureau of Clinical Information during the past year. They have registered from every country of Western Europe except Portugal; Russia, Czecho-Slovakia, Armenia; China, Japan, India, Ceylon, Formosa, Australia, South Africa; Argentina, Brazil, Colombia, Chile, Venezuela, Panama, Hawaii, the Philippines, Canada, from coast to coast, and from every state in the Union.

During the year the Bureau has gathered much information as to graduate medical work in England and on the Continent. This is being added to and kept up to date by publications and reports received from abroad, and through the courtesy of the officials of a number of international agencies, fellowships, societies, and particularly American medical men who have been taking graduate work abroad.

Respectfully submitted,

CHARLES N. DOWD,
Chairman.

HOSPITALS POSTING ON THE DAILY BULLETIN OF SURGICAL CLINICS

New York Hospitals

Beekman Street	Broad Street
Bellevue	Bronx
Beth David	City
Beth Israel	Columbus

New York Hospitals

Fifth Avenue	New York
Flower	New York Eye and Ear In-
Fordham	firmary
French	New York Orthopedic
Gouveneur	New York Polyclinic
Harlem	Nursery and Childs
Hospital for Joint Diseases	Lutheran of Manhattan
Hospital for Ruptured and	Peoples
Crippled	Post Graduate
Italian	Presbyterian
Jewish Memorial	Reconstruction
Knickerbocker	Roosevelt
Lebanon	St. Bartholomew
Lenox Hill	St. Francis
Lexington	St. Luke's
Lincoln	St. Mark's
Manhattan Eye, Ear and	St. Mary's Free Hosp. for Chil-
Throat	dren
Memorial	St. Vincent's
Metropolitan	Skin and Cancer
Montefiore	Sloane
Misericordia	U. S Marine No. 70
Mount Sinai	Veterans No. 81
Neurological Institute	Woman's

Brooklyn Hospitals

Beth Moses	Norwegian
Brooklyn	Peck Memorial
Brownsville and East N. Y.	Prospect Heights
Bushwick	St. Catherine's
Coney Island	St. John's
Cumberland Street	St. Mary's
Greenpoint	St. Peter's
Holy Family	Swedish
Jewish	United Israel Zion
Kings County	Wyckoff Heights
Long Island College	Harbor
Methodist Episcopal	

Staten Island

St. Vincent's

HOSPITALS POSTING ON THE WEEKLY BULLETIN OF MEDICAL CLINICS

I. *Hospitals posting once a month.*

Babies'
 Mt. Sinai (Pediatrics)
 Mt. Sinai (Neurology)
 Mt. Sinai Medical (Medicine)
 Riverside
 Jewish (Brooklyn)

II. *Hospitals posting twice a month.*

Lenox Hill
 Presbyterian
 St. Vincent's
 Veteran's
 Brooklyn
 Greenpoint

III. *Hospitals posting once a week.*

Neurological Institute
 Bellevue
 Harlem
 New York
 Lincoln

IV. *Hospitals posting more than once a week.*

Post Graduate. This hospital posts in:
 Neurology, four times a week.
 Pediatrics, daily.
 Medicine, daily

HOSACK BED FOR SICK AND NEEDY PHYSICIANS

Attention is directed to the following extract from the will of Mrs. Celine B. Hosack:

"I do give and bequeath unto my executors, hereinafter named, the sum of Ten Thousand Dollars, in trust, to apply and pay the same (or so much thereof as may be necessary) to The Roosevelt

Hospital in the city of New York, to purchase a bed which, in memory of my husband, shall be known as the Hosack Bed, and which shall be occupied from time to time by such sick and needy physicians as may for that purpose be named or designated by the President and Treasurer for the time being of The New York Academy of Medicine.”

REGULATIONS GOVERNING DONATIONS TO THE LIBRARY FUNDS

Donations and bequests are solicited by The New York Academy of Medicine for the maintenance and expansion of the Library.

A donation or bequest of \$5,000 or more will provide for a special library fund, the income of which may be used for the general purposes of the Library or restricted to the purchase of books and periodicals, as the donor or testator may indicate. When so restricted, a special bookplate will be used. A donation or bequest of less than \$5,000 but more than \$1,000 will provide for a named library fund, the income of which will be used for general library purposes or restricted for the purchase of books and periodicals, as desired by the donor or testator.

Donations of less than \$1,000 will be added to the general library funds.

NAMED FUNDS OF THE LIBRARY FORM FOR BEQUESTS

The following is a brief legal form as a suggestion under which bequests may be made in behalf of the Academy:

I give, devise and bequeath unto “The New York Academy of Medicine” of the City of New York, State of New York, a corporation duly incorporated by the Legislature of the State of New York by an act, entitled “An act to incorporate The New York Academy of Medicine,” passed June 23, 1851, and amended June 4, 1853, and June 2, 1877, and March 17, 1924

TRUST FUNDS OF THE NEW YORK ACADEMY OF MEDICINE.

Library Funds for the General Purposes of the Library:

THE LIBRARY FUND

Formed by gifts and from sales. Established in

1878 \$ 41,048.30

HORACE PUTNAM FARNHAM, M.D.,

LIBRARY FUND

Gift of Mrs. Eliza C. Farnham, in memory of her husband the late Horace P. Farnham, M.D., former Vice-President of the Academy. Established in 1889

10,000.00

J. MARION SIMS MEMORIAL

LIBRARY FUND

Gift of the Sims Monument Committee as a memorial of the late James Marion Sims, M.D. Established in 1896

100.00

JAMES S. CUSHMAN LIBRARY FUND

Gift of William F. Cushman, M.D., late Treasurer for the Trustees, as a memorial of his brother. Established in 1897

1,000.00

DR. ORVILLE RANNEY FLOWER LIBRARY FUND

Gift of the late Governor Roswell P. Flower, as a memorial of his uncle, Orville Ranney, M.D. Established in 1897

1,000.00

ANNA WOERISHOFFER LIBRARY FUND

Gift of Mrs. Anna Woerishoffer, established by the Academy as a special library fund in recognition of many generous contributions. Established in 1897

15,000.00

WILLIAM T. LUSK MEMORIAL LIBRARY FUND

Established by legacy, and gift of the children of
the late Dr. William T. Lusk. Established in
1898

1,000.00

SEMI-CENTENNIAL LIBRARY FUND

Established by the Semi-Centennial Celebration
Committee, December 13, 1898

500.00

GERMAN HOSPITAL AND DISPENSARY
LIBRARY FUND

Gift from the Collegium of the Physicians of the
German Hospital and Dispensary. Established
December 3, 1903

3,076.90

ALBERT WILLIAM WARDEN MEMORIAL
LIBRARY FUND

Legacy of Albert William Warden, M.D. Estab-
lished December 15, 1906

950.00

LONDON CARTER GRAY MEMORIAL LIBRARY FUND

Legacy of Landon Carter Gray, M.D. Established
in 1911

46,596.05

RUDOLPH A. WITTHAUS, M.D., LIBRARY FUND

Legacy of Rudolph A. Witthaus, M.D. Established
in 1917. (Principal not yet in the hands of the
Trustees, but will probably be about

120,000.00

Library Funds restricted for the purchase of books:

DR. EVERETT HERRICK LIBRARY FUND

Legacy of Everett Herrick, M.D. Established
in 1915

25,000.00

PHILIPPINE MEYER AND ERNST JACOBI
LIBRARY FUND

Gift of Mr. Jacob Meyer and Dr. A. Jacobi. In-
come to be used for the purchase of books.
Established in 1887

10,035.00

MERRILL WHITNEY WILLIAMS LIBRARY FUND

Gift of Mrs. Robert M. Gallaway as a memorial of her father. Income to be used for the purchase of books. Established in 1895 200.00

ERNST KRACKOWIZER LIBRARY FUND

Gift of friends of the late Ernst Krackowizer, M.D. Income to be used for the purchase of books. Established as a library fund in 1897. was originally a prize fund 1,798.05

AUSTIN FLINT, M.D., LL.D., MEMORIAL
LIBRARY FUND

Established by certain alumni of the Bellevue Hospital Medical College, and friends of the late Austin Flint, M.D., LL.D. Income to be used for the purchase of books. Established July 2, 1910 1,200.00

Library funds restricted for the purchase of special books:

THE BULLOWA MEMORIAL LIBRARY FUND

Gift of Jesse G. M. Bullowa, M.D., and others, in memory of their brother, Ferdinand E. M. Bullowa. Income to be used for the purchase of books relating to the ductless glands. Established in 1919 754.40

A. L. NORTHROP, D.D.S., DENTAL LIBRARY FUND

Gift of First District Dental Society, N. Y. Income to be used for the purchase, binding and care of books upon Dentistry. Established in 1897 250.00

DR. JAMES P. TUTTLE LIBRARY FUND

Legacy of James P. Tuttle, M.D. Income to be used for the purchase of books on Diseases of the Digestive Tract. Established in 1913 1,000.00

Funds restricted to Special Uses:

WESLEY M. CARPENTER LECTURESHIP FUND

Legacy of Wesley M. Carpenter, M.D. Income to be used annually for one medical lecture. Established in 1891	5,813.09
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EDWARD N. GIBBS MEMORIAL PRIZE FUND

Gift of Mrs. Edward N. Gibbs and Miss George Barker Gibbs (now Mrs. Charles H. Sherrill). Income to be awarded to a research worker on Diseases of the Kidney. Established in 1901	14,994.01
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ALFRED LEE LOOMIS ENTERTAINMENT FUND

Legacy of Alfred Lee Loomis, M.D., Ex-President of the Academy. Income to provide refreshments after meetings of the Academy. Established in 1895	10,000.00
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Unrestricted General Funds:

ENDOWMENT FUND

Formed by the admission fees of the Fellows and by any special donations or bequests that may be received for the fund. The income shall be expended, as necessary, for the construction, betterment or maintenance of the Academy. Established October 19, 1905	37,252.46
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GENERAL PERMANENT FUND

Formed by all gifts to The New York Academy of Medicine not otherwise specifically designated by donors. (Includes the legacies of Alexander B. Hosack, \$70,000.00, Everett Herriek, \$25,000.00, and Ramon Guiteras, \$4,911.80.) Income to be used for the purpose of advancing medical science under the direction of the Trustees	412,680.71
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Total of Trust Funds	\$761,268.97
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FELLOWS OF THE NEW YORK ACADEMY OF MEDICINE RESIDING IN NEW YORK CITY

1883	Abbe, Robert	1900	Ashley, Dexter D.
1913	Abbott, Theodore J.	1896	Aspell, John
1901	Abraham, Joseph H.	1921	Atkins, Richard T.
1910	Abrahamson, Isador	1919	Atonna, Carmelo
1917	Abramowitz, E. William	1906	Atwood, Charles E.
1921	Adair, Frank Earl	1910	Auchincloss, Hugh
1889	Adams, Calvin Thayer	1912	Auerbach, Julius
1901	Adams, Charles F.	1909	Avery, Oswald T.
1905	Adams, Warren S.	1918	Babcock, James W.
1916	Addoms, Lewis P.	1918	Baehr, George
1909	Agatston, Sigmund A.	1916	Bailey, Cameron V.
1908	Aitken, James Francis	1911	Bailey, Harold C.
1907	Albee, Fred H.	1901	Bainbridge, William Seaman
1918	Alexander, Lawrence D., Jr.	1918	Bainton, Joseph H.
1905	Alger, Ellice M.	1921	Baketel, H. Sheridan
1920	Allen, Frederick M.	1924	Bakwin, Harry
1881	Allen, Thomas H.	1900	Baldwin, Helen
1921	Altman, Emil	1907	Ballin, Milton J.
1915	Ames, Thaddeus H.	1914	Bancroft, Frederic W.
1915	Amey, J. Willis	1914	Bandler, Clarence G.
1918	Amster, J. Lewis	1901	Bandler, Samuel W.
1918	Anderton, Walter P.	1908	Bang, Richard T.
1924	Andresen, Albert F. R.	1924	Banowitch, Morris M.
1923	Andrews, George Clin- ton	1914	Barber, W. Howard
1909	Aranow, Harry	1908	Barringer, Benjamin S.
1918	Armstrong, Arthur S.	1908	Barringer, Emily Dun- ning
1924	Armstrong, Donald B.	1906	Barringer, Theodore B., Jr.
1922	Armstrong, Edgar B.	1924	Barrows, David Nye
1917	Armstrong, Edward McP.	1909	Bartlett, Frederic H.
1889	Aronson, Moses	1905	Bartley, Elias Hudson
1906	Arrowsmith, Hubert	1889	Barton, Joshua L.
1913	Asch, Joseph Jefferson	1899	Baruch, Herman B.
1919	Aschner, Paul W.	1909	Basch, Seymour

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| 1913 Bass, Murray H. | 1910 Blank, Marcus I. |
| 1908 Bassler, Anthony | 1919 Blatteis, Simon R. |
| 1914 Bastedo, Walter A. | 1896 Blodgett, Frank J. |
| 1914 Baughman, William H. | 1899 Bloom, Selina |
| 1919 Bauman, Louis | 1916 Blum, Theodor |
| 1920 Beach, Bennett S. | 1913 Blumgart, Leonard |
| 1918 Bebb, Rose Anne | 1916 Blumgarten, Aaron S. |
| 1912 Bechet, Paul E. | 1921 Boas, Ernst P. |
| 1921 Beck, Alfred Charles | 1918 Bodenheimer, Milton |
| 1911 Beekman, Fenwick | 1924 Boehm, Joseph L. |
| 1905 Beer, Edwin | 1917 Boettiger, Carl |
| 1906 Begg, Colin L. | 1925 Bohrer, John V. |
| 1897 Belcher-Hardy, Sarah
D. | 1884 Boldt, Hermann J. |
| 1923 Bell, Alfred Lee Loomis | 1914 Bolling, Richard W. |
| 1904 Bell, George H. | 1916 Bonime, Ellis |
| 1918 Beller, Abraham J. | 1907 Bookman, Arthur |
| 1916 Berens, Conrad | 1918 Bookman, Milton R. |
| 1900 Berg, Albert A. | 1920 Boorstein, Samuel W. |
| 1890 Berg, Henry W. | 1885 Booth, J. Arthur |
| 1923 Bergamini, Herbert M. | 1887 Born, Rudolph O. |
| 1902 Berkeley, William N. | 1880 Bosworth, Francke H. |
| 1923 Berne, Luis P. | 1915 Bowers, Wesley C. |
| 1924 Bernstein, Max | 1916 Boyd, Carlisle S. |
| 1917 Berry, Charles White | 1904 Boyer, Arthur A. |
| 1925 Berry, Frank B. | 1925 Boynton, Perry S. |
| 1920 Bibby, Henry L. | 1916 Bradbury, Samuel |
| 1900 Bickham, Warren S. | 1914 Bradshaw, William M. |
| 1901 Bierhoff, Frederic | 1918 Brandaleone, Joseph |
| 1895 Biggs, George P. | 1888 Brannan, John Winters |
| 1903 Billings, John S. | 1908 Braun, Alfred |
| 1920 Bingham, Anne Tefft | 1917 Brennan, Robert E. |
| 1913 Bishop, Ernest S. | 1918 Brenner, Edward C. |
| 1893 Bishop, Louis F. | 1919 Brenner, Isidore M. |
| 1903 Bissell, Dougal | 1924 Brennglass, Joachim |
| 1915 Black, Florence A. | 1897 Brettauer, Joseph |
| 1910 Blackwell, Hugh B. | 1889 Brewer, George E. |
| 1895 Blake, Joseph A. | 1905 Brickner, Walter M. |
| 1924 Blancard, William | 1912 Brill, Abraham A. |
| | 1887 Brill, Nathan E. |

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| 1914 Broder, Charles B. | 1914 Callison, James G. |
| 1904 Brodhead, George L. | 1898 Camac, Charles N. B. |
| 1880 Bronson, Edward B. | 1922 Campbell, Ernest A. |
| 1921 Brooks, Alexander | 1902 Campbell, William |
| 1904 Brooks, Harlow | Francis |
| 1897 Brouner, Walter B. | 1924 Cannon, A. Benson |
| 1922 Brown, Aaron | 1917 Caples, Byron H. |
| 1912 Brown, Ethel Doty | 1918 Carber, Frank H. |
| 1901 Brown, Samuel A. | 1902 Carlisle, Robert J. |
| 1922 Brown, Sanger, 2d. | 1921 Carlucci, Gaston A. |
| 1895 Brown, Willett Stuart | 1885 Carman, Albro R. |
| 1918 Bruder, Joseph | 1922 Carp, Louis |
| 1904 Bryan, William | 1921 Carr, Frank C. |
| 1904 Bryant, William Sohler | 1886 Carr, Walter Lester |
| 1904 Buehler, Augustus F. | 1905 Carter, Herbert S. |
| 1909 Buerger, Leo | 1925 Carter, Rupert F. |
| 1910 Bugbee, Henry G. | 1904 Carter, William W. |
| 1874 Bulkley, L. Duncan | 1920 Casamajor, Louis |
| 1907 Bullowa, Jesse G. M. | 1915 Cash, Stanmore L. |
| 1887 Burch, T. Hamilton | 1906 Cassebeer, Henry A. |
| 1910 Burdick, Carl G. | 1905 Cassell, James Wilson |
| 1915 Burk, Samuel B. | 1910 Caturani, Michele G. |
| 1886. Burke, Martin | 1884 Cauldwell, Charles M. |
| 1922 Burlingame, C. C. | 1921 Cave, Henry W. |
| 1920 Burnham, Athel C. | 1910 Cecil, Russell L. |
| 1906 Burnham, Herbert D. | 1909 Celler, Herbert L. |
| 1908 Burrows, Waters Field | 1908 Chace, Arthur F. |
| 1886 Burt, Stephen Smith | 1920 Chalmers, Thomas |
| 1911 Busby, Archibald H. | Clark |
| 1893 Butler, Glentworth R. | 1886 Chapin, Henry Dwight |
| 1920 Butterfield, Paul M. | 1920 Chaplin, Hugh |
| 1905 Byard, Dever S. | 1904 Chard, Marie Louise |
| 1914 Byrne, Joseph | 1914 Chargin, Louis |
| 1900 Byrne, Joseph H. | 1922 Chase, Herbert C. |
| 1922 Cahill, George F. | 1915 Cherry, Thomas H. |
| 1885 Caillé, Augustus | 1896 Chetwood, Charles H. |
| 1918 Caldwell, William E. | 1908 Child, Charles Gardner, |
| 1920 Calhoun, William C. | Jr. |
| 1888 Callan, Peter A. | |

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|------|-----------------------------|------|---------------------------|
| 1924 | Chilian, Stephen A. | 1908 | Cooke, Robert A. |
| 1905 | Chisholm, William Alexander | 1922 | Coonley, Frederick |
| 1901 | Cilley, Arthur H. | 1923 | Cornwall, Leon H. |
| 1907 | Clark, A. Schuyler | 1912 | Cornwell, Herbert C. deV. |
| 1904 | Clark, J. Bayard | 1910 | Corseaden, James A. |
| 1896 | Clark, L. Pierce | 1921 | Coryell, Clarence C. |
| 1922 | Clark, Raymond | 1912 | Coughlin, John Henry |
| 1901 | Clemens, James B. | 1922 | Courten, Henry C. |
| 1879 | Cleveland, Clement | 1925 | Cowett, Max P. |
| 1922 | Cleveland, Mather | 1924 | Cowles, Henry Clay |
| 1894 | Coakley, Cornelius G. | 1922 | Craig, C. Burns |
| 1917 | Coca, Arthur F. | 1924 | Craig, Stuart L. |
| 1885 | Coe, Henry C. | 1908 | Cramp, Walter C. |
| 1917 | Cofer, Leland E. | 1921 | Crampton, C. Ward |
| 1892 | Coffin, Lewis A. | 1910 | Crigler, Lewis W. |
| 1891 | Coggeshall, Henry | 1900 | Crispin, Antonio M. |
| 1924 | Cohen, Harry | 1912 | Crohn, Burrill B. |
| 1921 | Cohen, Ira | 1921 | Cross, Frank B. |
| 1919 | Cohen, J. Bernard | 1922 | Cudmore, John H. |
| 1905 | Cohen, Martin | 1901 | Culbert, William L. |
| 1910 | Cohn, Alfred E. | 1904 | Culler, Frederick W. |
| 1890 | Cohn, Felix | 1921 | Cunningham, Wm. F. |
| 1891 | Cole, Carter S. | 1887 | Currier, Charles G. |
| 1910 | Cole, Lewis G. | 1915 | Curtin, Thomas H. |
| 1909 | Cole, Rufus I. | 1923 | Cussler, Edward |
| 1915 | Coleman, Joseph | 1904 | Cutler, Colman W. |
| 1904 | Coleman, Warren | 1892 | Cutler, Condict W. |
| 1925 | Coley, Bradley L. | 1923 | Cutler, Condict W., Jr. |
| 1892 | Coley, William B. | 1922 | Cutter, William D. |
| 1910 | Colie, Edward M., Jr. | 1923 | D'Albora, John B. |
| 1925 | Collings, Clyde W. | 1886 | Dana, Charles L. |
| 1905 | Collins, Charles F. | 1922 | Dannreuther, Walter T. |
| 1898 | Collins, Howard D. | 1922 | Danzer, Charles S. |
| 1892 | Collins, Joseph | 1908 | Danziger, Ernst |
| 1922 | Colp, Ralph | 1911 | Darling, Byron C. |
| 1913 | Conley, Walter H. | 1904 | Darlington, Thomas |
| 1900 | Conner, Lewis A. | 1908 | Darrach, William |
| 1905 | Connors, John F. | 1924 | Davidson, Louis R. |

1899	Davis, A. Edward	1920	Doran, William T.
1909	Davis, Asa Barnes	1904	Dorman, Franklin A.
1913	Davis, Fellowes, Jr.	1888	Dorning, John
1909	Davis, George E.	1891	Doty, Alvah H.
1920	Davis, Thomas K.	1904	Dougherty, Daniel S.
1922	Dean, Archie L., Jr.	1905	Douglas, John
1920	Decker, John J.	1894	Douglass, H. Beaman
1904	de Forest, Henry P.	1923	Dourmashkin, Ralph
1900	Delatour, H. Beeckman	1900	Dow, Edmund LeRoy
1880	Delavan, D. Bryson	1889	Dowd, Charles N.
1921	Delphey, Eden V.	1923	Dowd, Heman L.
1918	Deming, Nelson L.	1902	Downes, William A.
1890	Dench, Edward B.	1905	Downey, Martin
1908	Denenholz, Aaron	1911	Draper, George
1902	Denig, Rudolf	1904	Draper, John W.
1908	Dennett, Roger H.	1892	Draper, William K.
1879	Dennis, Frederic S.	1918	Druskin, Samuel J.
1916	Denno, Willard J.	1901	Duane, Alexander
1916	Denzer, Bernard S.	1910	Du Bois, Eugene F.
1922	DeSanctis, Adolph George G.	1911	Du Bois, Francis E.
1915	DeSanctis, Nicholas M.	1919	Du Bois, Phebe Lott
1917	Detwiller, Albert K.	1917	Dudley, Guilford S.
1918	De Vecchi, Paolo	1899	Duel, Arthur B.
1918	Diamond, Joseph S.	1893	Dunham, Theodore
1891	Dickinson, Robert L.	1915	Dunning, Henry Sage
1890	Dillingham, Frederic H.	1916	Dunning, William M.
1924	Dineen, Paul A.	1921	Dunnington, John H.
1917	Diner, Jacob	1916	Durkee, John W.
1922	di Palma, Salvatore	1923	Duryea, Chester F.
1906	Ditman, Norman E.	1923	Dwight, Kirby
1884	Dixon, George A.	1913	Dwyer, James G.
1906	Dixon, George S.	1921	Echeverria, Frederick J.
1922	Dodd, Raymond C.	1922	Edelman, Leo
1887	D'Oench, Frederick E.	1922	Edelman, Moses H.
1885	Dold, William E.	1890	Edgar, J. Clifton
1921	Donaldson, Blake F.	1903	Edgerton, Francis C.
1922	Donnelly, William H.	1921	Eggers, Carl
1924	Donnet, John V.	1915	Eggleson, Cary
		1922	Eggston, Andrew A.

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|------|-----------------------|------|-------------------------|
| 1891 | Einhorn, Max | 1907 | Ferguson, Robert H. |
| 1924 | Eisberg, Harry B. | 1924 | Field, Cyrus W. |
| 1906 | Eisenberg, Isidore C. | 1906 | Field, Frank H. |
| 1904 | Eising, Eugene H. | 1920 | Finkelstein, Harry |
| 1906 | Eliot, Ellsworth, Jr. | 1913 | Finley, Caroline S. |
| 1925 | Eller, Joseph J. | 1901 | Fischer, Charles Sumner |
| 1921 | Elliott, Edward S. | 1908 | Fischer, Hermann |
| 1886 | Elliott, George R. | 1890 | Fischer, Louis |
| 1921 | Elmendorf, Ten Eyck | 1913 | Fishberg, Maurice |
| 1897 | Elsberg, Charles A. | 1886 | Fisher, Edward D. |
| 1921 | Elwyn, Herman | 1918 | Fisher, Judson C. |
| 1894 | Ely, Albert H. | 1893 | Fisk, Arthur Lyman |
| 1904 | Emerson, Haven | 1909 | Fisk, Eugene L. |
| 1925 | Ende, Frank Macbeth | 1924 | Fiske, Edwin Rodney |
| 1913 | Engelson, Joseph E. | 1895 | Fiske, James Porter |
| 1911 | Epstein, Albert A. | 1896 | Fitch, Allen |
| 1908 | Epstein, Sigmund | 1916 | Fitzgerald, Fred J. C. |
| 1910 | Erdman, Seward | 1920 | Fletcher, Norton |
| 1892 | Erdmann, John F. | | DeL. L. |
| 1916 | Evans, Evan M. | 1905 | Flexner, Simon |
| 1900 | Evans, Samuel M. | 1894 | Flint, Austin |
| 1907 | Everitt, Chauncey V. | 1909 | Floyd, Rolfe |
| 1897 | Ewing, James | 1922 | Fobes, Joseph H. |
| 1905 | Fahnestock, Ernest | 1899 | Foote, Edward M. |
| 1916 | Falk, Henry C. | 1914 | Forbes, Henry Hall |
| 1924 | Famulener, Lemuel W. | 1904 | Ford, William M. |
| 1906 | Fanoni, Antonio | 1890 | Foster, George V. |
| 1909 | Farr, Charles E. | 1911 | Foster, Nellis B. |
| 1912 | Farr, Edgar H. | 1919 | Fowler, Robert H. |
| 1914 | Farrar, Lilian K. P. | 1906 | Fowler, Russell S. |
| 1910 | Farrell, Benjamin P. | 1916 | Fox, Elsie |
| 1910 | Faulkner, E. Ross | 1880 | Fox, George H. |
| 1904 | Feinberg, Israel L. | 1904 | Fox, Howard |
| 1922 | Feinblatt, Henry M. | 1913 | Frankel, Edward, Jr. |
| 1923 | Felberbaum, David | 1918 | Fraser, John F. |
| 1922 | Feldman, Samuel | 1898 | Frauenthal, Henry W. |
| 1908 | Feldstein, Samuel | 1904 | Frauenthal, Herman C. |
| 1922 | Felsen, Joseph | 1923 | Freed, Frederick C. |
| 1904 | Ferguson, Jeremiah S. | 1892 | Freeman, Rowland G. |

1886	French, Thomas R.	1923	Globus, Joseph H.
1924	Freudenfall, Benjamin	1912	Glogau, Otto
1889	Freudenthal, Wolff	1918	Goeller, Charles J.
1886	Fridenberg, Albert H.	1922	Goetsch, Emil
1909	Fried, Gustav A.	1887	Goffe, J. Riddle
1918	Friedman, Emanuel D.	1900	Goldan, S. Ormond
1908	Friedman, Gedide A.	1919	Goldberger, Isidore H.
1908	Friedman, Louis	1922	Goldberger, Lewis A.
1913	Friesner, Isidore	1923	Golden, Ross
1907	Frink, Claude A.	1891	Goldenberg, Hermann
1918	Frink, Horace W.	1918	Goldstein, Isidore
1904	Frissell, Lewis F.	1908	Goldwater, Sigismund S.
1919	Froehlich, Eugene	1922	Gonzales, Thomas A.
1896	Frthingham, Richard	1922	Goodfellow, Lillian M.
1888	Fuhs, Jacob	1913	Goodfriend, Nathan
1921	Fulkerson, Lynn Lyle	1906	Goodhart, S. Philip
1907	Furniss, Henry Dawson	1899	Goodman, Abraham L.
1924	Gager, Leslie T.	1903	Goodman, Charles
1900	Gant, Samuel G.	1924	Goodman, Herman
1916	Garbat, Abraham L.	1906	Goodridge, Malcolm
1918	Gardner, Faxton E.	1922	Goodwin, Norman C.
1889	Garmany, Jasper J.	1922	Gottesman, Julius
1924	Gates, Frederick L.	1922	Gottlieb, Charles
1921	Gatewood, William L.	1922	Gottlieb, Mark J.
1914	Gaudiani, Vincent	1915	Gould, Everett W.
1916	Geiringer, David	1923	Grace, Roderick V.
1914	Geist, Samuel H.	1905	Grad, Hermann
1921	Gelber, Charles N.	1908	Graef, Charles
1910	Gerster, John C. A.	1907	Graeser, Herman R. A.
1901	Gibb, W. Travis	1924	de Graffenried, Anthony F.
1877	Gibney, Virgil P.	1924	Graham, John R.
1893	Gibson, Charles L.	1910	Grant, John P.
1924	Gibson, Gordon M.	1889	Grauer, Frank
1894	Gilfillan, W. Whitehead	1909	Grausman, Philip M.
1906	Gillespie, David H. M.	1919	Graves, Gaylord W.
1921	Gillette, Curtenius	1904	Greeff, J. G. William
1909	Gilmour, Andrew J.	1905	Green, Nathan W.
1887	Girdner, John H.		
1918	Glafke, William H.		

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|------|-----------------------|------|-----------------------|
| 1925 | Greenberg, David | 1902 | Haskin, William H. |
| 1913 | Greene, James S. | 1922 | Hatcher, Robert A. |
| 1891 | Greene, Robert H. | 1897 | Haubold, Herman A. |
| 1908 | Gregory, Alice | 1923 | Hauswirth, Louis |
| 1908 | Gregory, Menas S. | 1895 | Hawkes, Forbes |
| 1895 | Griffin, E. Harrison | 1922 | Hawkins, William H. |
| 1915 | Gross, Maurice H. | 1921 | Hawks, Everett M. |
| 1909 | Gross, Moritz | 1901 | Hayes, William Van V. |
| 1918 | Grossman, Morris | 1897 | Haynes, Irving S. |
| 1918 | Grushlaw, Israel | 1907 | Haynes, Royal S. |
| 1914 | Guile, Hubert V. | 1909 | Hays, Harold M. |
| 1922 | Gulliver, Francis D. | 1918 | Healy, William P. |
| 1898 | Guttman, John | 1895 | Heiman, Henry |
| 1909 | Gwathmey, James T. | 1918 | Heine, Joseph |
| 1901 | Haas, Sidney V. | 1890 | Heitzmann, Louis |
| 1909 | Haberman, J. Victor | 1918 | Held, Isidore W. |
| 1925 | Hajek, Joseph | 1910 | Heller, Isaac M. |
| 1904 | Hale, Henry Ewing | 1909 | Hellman, Alfred M. |
| 1918 | Hall, John Mead | 1921 | Hennessy, James P. |
| 1891 | Hallock, Silas F. | 1908 | Hensel, Otto |
| 1917 | Halpern, Julius | 1920 | Herly, Louis |
| 1904 | Halsey, Robert H. | 1910 | Herrick, William W. |
| 1921 | Halsted, Harbeck | 1922 | Herriman, Frank R. |
| 1903 | Hamlen, George D. | 1902 | Herrman, Charles |
| 1916 | Hanford, John Munn | 1919 | Hertz, Julius J. |
| 1914 | Hansen, Ejnar | 1904 | Herzfeld, Alfred A. |
| 1921 | Harkavy, Joseph | 1911 | Herzig, Arthur J. |
| 1904 | Harlow, Ellwood | 1906 | Hess, Alfred F. |
| 1913 | Harrar, James A. | 1922 | Hetrick, Llewellyn E. |
| 1909 | Harrigan, Anthony H. | 1914 | Heyd, Charles Gordon |
| 1904 | Harris, E. Eliot | 1918 | Heyman, Marcus P. |
| 1918 | Harris, Isham Greene | 1899 | Hibbs, Russell A. |
| 1921 | Harris, Louis I. | 1924 | Higgins, William McK. |
| 1894 | Harris, Thomas J. | 1922 | Higgins, William M. |
| 1904 | Hart, T. Stuart | 1910 | Highman, Walter J. |
| 1911 | Hartshorn, Winfred M. | 1917 | Hilkowich, Abe M. |
| 1917 | Hartshorne, Isaac | 1903 | Hill, Ira L. |
| 1901 | Hartwell, John A. | 1915 | Hill, Miner C. |
| 1918 | Hasbrouck, James F. | 1887 | Hillis, Thomas J. |

1914	Hillman, Oliver S.	1905	Hunt, Edward L.
1909	Hinkle, Beatrice M.	1903	Hunt, J. Ramsay
1913	Hirsch, I. Seth	1917	Hunt, Westley M.
1921	Hirsh, A. Bern	1901	Hurd, Lee M.
1904	Hitzrot, James M.	1924	Hurd, Ralph A.
1921	Hoeh, George F.	1920	Hutchinson, Abbott T.
1911	Heguet, Joseph P.	1912	Huxelle, Rene H.
1909	Holden, Frederick C.	1918	Hyams, Joseph A.
1894	Holden, Ward A.	1882	Hyde, Frederick E.
1920	Holladay, Edwin W.	1910	Hyman, Abraham
1907	Holland, Arthur L.	1924	Hyman, Harold T.
1902	Hollister, Frank C.	1903	Hymanson, Abraham
1921	Honan, William F.	1908	Hynes, William Rose
1887	Honegger, Oscar P.	1900	Illoway, Henry
1924	Hooker, Henry L.	1923	Imboden, Harry M.
1906	Hooker, Ransom S.	1910	Imperator, Charles J.
1904	Hopkins, Frank T.	1918	Ingerman, Sergius M.
1901	Horn, John	1908	Ippolito, Gennaro
1922	Horn, Walter L.	1924	Irish, William H.
1913	Herowitz, Philip	1922	Irving, George R.
1923	Hough, Perry B.	1913	Irving, Peter
1913	Houghton, Harris A.	1918	Irwin, Frank N.
1925	Howard, Robert C.	1909	Isaacs, Harry E.
1922	Howard, Tasker	1920	Isham, Mary K.
1923	Howe, Alexander C.	1915	Ives, Robert F.
1919	Howe, Hubert S.	1908	Jaches, Leopold
1905	Hubbard, Ernest V.	1893	Jackson, Victor Hugo
1896	Hubbard, William N.	1905	Jacobson, Sidney D.
1901	Hubby, Lester M.	1879	Jacobus, Arthur M.
1885	Huber, Francis	1885	Jacoby, George W.
1911	Huber, Frederick W.	1904	Jacoby, J. Ralph
1923	Hubert, Louis	1904	Jaeger, Charles H.
1919	Huddleson, James H.	1916	James, Henry
1919	Huey, Arthur J.	1889	James, Walter B.
1918	Huffman, Otto V.	1913	Jarcho, Julius
1910	Hühner, Max	1900	Jarecky, Herman
1911	Humphries, Henry R.	1905	Jarvis, Nathan S.
1916	Humphries, Robert E.	1919	Jeck, Howard S.
1924	Hunt, Charles Jack	1900	Jelliffe, Smith Ely

1914	Jellinghaus, C. Frederick	1922	Keschnner, Moses
1918	Jenison, Nancy	1909	Kessel, Leo
1921	Jennings, John E.	1915	Key, Ben Witt
1922	Joachim, Henry	1898	Keyes, Edward L.
1918	Johnson, Frank E.	1919	Keyes, Harold B.
1922	Johnson, Kenneth	1912	Kilbane, Edward F.
1924	Johnson, Thomas H.	1895	Kilham, Eleanor B.
1918	Jones, David H.	1920	Kindred, John J.
1922	Jones, Marvin F.	1919	King, Edward A.
1909	Jonesoff, Emmanuel	1915	King, James J.
1904	Judd, Aspinwall	1920	King, Joseph E. J.
1922	Judd, Harold B.	1902	King, Thomas A.
1910	Kaempfer, Louis G.	1906	Kingsbury, Jerome
1918	Kahn, Alfred	1922	Kinloch, Robert E.
1912	Kahn, L. Miller	1918	Kirby, George H.
1914	Kahn, Max	1922	Kirwin, Thomas J.
1918	Kahn, Morris H.	1922	Klein, Eugene
1909	Kaliski, David J.	1922	Klein, William
1917	Kantor, John L.	1914	Kleinberg, Samuel
1910	Kast, Ludwig	1897	Knapp, Arnold H.
1876	Katzenbach, William H.	1918	Knight, Frank H.
1922	Kaufman, Louis R.	1907	Knipe, William H. W.
1906	Kaufmann, Jacob	1897	Knopf, S. Adolphus
1918	Kearney, James A.	1921	Knopf, Saul
1909	Keller, Frederick C.	1922	Koffler, Emil
1922	Kelley, Catherine Rose	1924	Kohn, Jerome L.
1909	Kellogg, Edward L.	1898	Koller, Carl
1879	Kellogg, Theodore H.	1906	Kopetzky, Samuel J.
1920	Kelly, Joseph D.	1888	Koplik, Henry
1925	Kemp, Edward J.	1904	Kosmak, George W.
1912	Kennedy, Foster	1911	Kovács, Richard
1914	Kent, James M.	1920	Kraus, Walter M.
1904	Kenyon, James H.	1923	Krida, Arthur
1924	Kenyon, Josephine H.	1922	Kross, Isidor
1899	Kerley, Charles G.	1917	Krug, Ernest F.
1919	Kerley, James H.	1891	Ladin, Louis J.
1913	Kernan, John D., Jr.	1898	La Petra, Linnaeus E.
1901	Kerrison, Philip D.	1921	Laidlaw, George F.
		1907	Laighton, Florence M.

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|------|-----------------------|------|--------------------------------|
| 1912 | Lamb, Albert R. | 1897 | Lewis, Robert |
| 1910 | Lambert, Adrian V. S. | 1908 | Lewisohn, Richard |
| 1893 | Lambert, Alexander | 1911 | Lewson, Maximilian |
| 1891 | Lambert, Samuel W. | 1918 | Lewy, Raphael |
| 1897 | Lambert, Walter E. | 1900 | Libman, Emanuel . |
| 1923 | Lampe, Herman F. | 1910 | Lieb, Charles C. |
| 1918 | Landsman, Arthur L. | 1920 | Lieb, Clarence W. |
| 1922 | Langmann, Alfred G. | 1924 | Lightstone, Abraham |
| 1918 | Langrock, Edwin G. | 1891 | Lilienthal, Howard |
| 1910 | Laporte, George L. | 1918 | Lindeman, Howard E. |
| 1897 | Lapowski, Boleslaw | 1917 | Linder, William |
| 1922 | Lasher, Willis W. | 1915 | Little, George F. |
| 1922 | Lattin, Berton | 1910 | Lloyd, Henry W. |
| 1921 | Lau, Frederick T. | 1891 | Lloyd, Samuel |
| 1920 | Lavandera, Miguel | 1904 | Lobenstine, Ralph W. |
| 1920 | Lavell, Thomas E. | 1888 | Lockwood, George R. |
| 1908 | Law, Frederick M. | 1917 | Loewenstein, Helene
Correll |
| 1913 | Law, James | 1920 | Lombardo, Melchiorre |
| 1919 | Lawrance, Elliot W. | 1914 | Long, William B. |
| 1903 | Lawrence, George A. | 1919 | Lopez, Jose A. |
| 1921 | Leahy, Sylvester R. | 1917 | Losee, Joseph R. |
| 1869 | Leale, Charles A. | 1905 | Loughran, Robert L. |
| 1908 | Leale, Medwin | 1919 | Love, Andrew J. |
| 1921 | Lederer, Max | 1911 | Lovell, Frederick S. |
| 1897 | Lederman, Moses D. | 1916 | Lowsley, Oswald S. |
| 1904 | Lee, Burton J. | 1904 | Luckett, William H. |
| 1914 | Leo, Johanna B. | 1922 | Lucus, Thomas D'Arey |
| 1910 | Leopold, Jerome S. | 1910 | Ludlum, Walter D. |
| 1924 | L'Episcopo, Joseph B. | 1904 | Lumbard, Joseph E. |
| 1902 | Leshure, John | 1898 | Lusk, William C. |
| 1916 | L'Esperance, Elise S. | 1905 | Lyle, Henry H. M. |
| 1905 | Levin, Isaac | 1908 | Lyle, William G. |
| 1919 | Levin, Oscar L. | 1898 | Lynch, John B. |
| 1924 | Levinson, Bernard | 1922 | Lyttle, John D. |
| 1922 | Levy, Robert L. | 1895 | McAlpin, David H. |
| 1911 | Le Wald, Leon T. | 1916 | McAlpin, Kenneth R. |
| 1906 | Lewi, Emily | 1901 | McAuliffe, George B. |
| 1922 | Lewis, Raymond W. | 1903 | McBarron, John D. |

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| 1918 McCabe, John | 1908 Macpherson, Duncan |
| 1922 McCafferty, Lawrence K. | 1909 McPherson, Ross |
| 1909 McCarthy, Joseph F. | 1924 MacRobert, Russell G. |
| 1907 McCaskey, Donald | 1920 McSweeney, Edward S. |
| 1912 McCastline, William H. | 1901 McWilliams, Clarence A. |
| 1919 McCombs, Carl E. | 1894 Mabbott, J. Milton |
| 1904 McCoy, John J. | 1920 Maddren, William H. |
| 1905 McCreery, Forbes R. | 1923 Magid, Maurice O. |
| 1914 McCreery, John A. | 1913 Malcolm, Percy E. D. |
| 1904 McCullagh, Samuel | 1905 Mallett, George H. |
| 1921 McDannald, Clyde E. | 1920 Maloney, Edward R. |
| 1904 MacDonald, Carlos F. | 1914 Maloney, William J. M. A. |
| 1902 McDonald, Dennis J. | 1914 Mandel, Arthur R. |
| 1887 Macdonald, George A. | 1904 Mandelbaum, Frederick S. |
| 1914 MacEvitt, John C. | 1892 Manges, Morris |
| 1922 McGrath, John F. | 1917 Manley, Herbert D. |
| 1903 McGrath, John J. | 1923 Mann, Hubert |
| 1904 MacGuire, Constantine J. | 1904 Mannheimer, George |
| 1919 MacGuire, Constantine J., Jr. | 1913 Manning, G. Randolph |
| 1922 MacGuire, Daniel P. | 1920 Marcus, Leopold |
| 1897 MacHale, Ferdinand S. | 1921 Marine, David |
| 1920 McHenry, Junius H. | 1921 Marshall, Samuel A. |
| 1925 McIntosh, Rustin | 1911 Martin, Thomas A. |
| 1908 MacKee, George M. | 1906 Martin, Walton |
| 1921 McKendree, Charles A. | 1918 Mason, Frederic S. |
| 1920 McKenna, William F. | 1909 Mason, Howard H. |
| 1904 Mackenty, John E. | 1882 Mason, Lewis D. |
| 1920 Mackenzie, George M. | 1904 Mathews, Francis S. |
| 1894 McKernon, James F. | 1909 Matthews, Frank C. |
| 1913 McLean, Stafford | 1924 Matthews, Frederick J. |
| 1911 Macleod, William P. | 1886 May, Charles H. |
| 1920 MacNeal, Ward J. | 1907 May, William Ropes |
| 1917 McNeill, Walter H., Jr. | 1918 Maybaum, Jacob L. |
| 1910 MacNevin, Malcolm G. | 1892 Mayer, Emil |
| 1888 McNutt, Sarah J. | 1918 Mayer, Leo |
| 1905 MacPhee, John J. | 1904 Meara, Frank S. |

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|------|-----------------------------|------|------------------------|
| 1905 | Meding, Charles B. | 1890 | Morris, Lewis R. |
| 1916 | Meeker, Harold D. | 1891 | Morris, Robert T. |
| 1922 | Meichner, Frederick H., Jr. | 1925 | Morrissey, John H. |
| 1900 | Meierhoff, Edward L. | 1916 | Morrow, Albert S. |
| 1918 | Mencken, Harry P. | 1891 | Mortimer, W. Golden |
| 1920 | Merriman, M. Heminway | 1897 | Morton, Henry H. |
| 1924 | Merritt, Katherine K. | 1910 | Morton, Rosalie S. |
| 1902 | Mersereau, William J. | 1900 | Moschcowitz, Alexis V. |
| 1885 | Meyer, Alfred | 1906 | Moschcowitz, Eli |
| 1925 | Meyer, Herbert Willy | 1907 | Mosenthal, Herman O. |
| 1906 | Meyer, Leo B. | 1919 | Mosler, Fred H. |
| 1887 | Meyer, Willy | 1924 | Moss, Abraham |
| 1921 | Meynen, George K. | 1908 | Moss, L. Howard |
| 1907 | Michaelis, Alfred | 1909 | Mulholland, Joseph A. |
| 1904 | Michailovsky, Michael | 1918 | Munn, Aristine P. |
| 1912 | Michel, Leo L. | 1882 | Munn, John P. |
| 1918 | Milbank, Samuel | 1892 | Munroe, George E. |
| 1906 | Miller, Frank E. | 1910 | Murphy, Deas |
| 1920 | Miller, Heymen R. | 1906 | Murray, Archibald |
| 1904 | Miller, James Alexander | 1922 | Murray, Clay Ray |
| 1906 | Milliken, Seth M. | 1889 | Murray, Francis W. |
| 1901 | Mills, Jackson M. | 1924 | Myers, Florizel deL. |
| 1924 | Mills, Nathaniel | 1905 | Myers, Howard G. |
| 1925 | Mitchell, Wendell | 1925 | Myers, Lotta Wright |
| 1904 | Mittelstaedt, Charles B. J. | 1890 | Myers, T. Halsted |
| 1910 | Mittendorf, Alfred D. | 1889 | Myles, Robert C. |
| 1916 | Mixsell, Harold R. | 1884 | Nammack, Charles E. |
| 1922 | Moffat, Barclay W. | 1903 | Napier, Charles D. |
| 1913 | Moffett, Rudolph D. | 1903 | Nathan, Philip W. |
| 1918 | Moitrier, William, Jr. | 1921 | Neal, Josephine B. |
| 1889 | Monaelesser, Adolph | 1923 | Neer, Edmonde DeWitt |
| 1924 | Montague, Joseph F. | 1922 | Neergaard, Arthur E. |
| 1904 | Mooney, Henry W. | 1909 | Neuhof, Harold |
| 1909 | Moore, Albertus A. | 1918 | Neustaedter, Marcus |
| 1904 | Moorhead, John J. | 1922 | Ney, K. Winfield |
| 1912 | Morris, Dudley H. | 1908 | Niles, Walter L. |
| 1923 | Morris, John H. | 1918 | Nilsen, Arthur |
| | | 1886 | Nilsen, Jonas R. |
| | | 1917 | Nilson, S. John |

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|------|--------------------------|------|-------------------------|
| 1905 | Norrie, Van Horne | 1915 | Pearson, Charles E. |
| 1906 | Norris, Charles | 1910 | Pearson, Henry |
| 1886 | Northrup, William P. | 1910 | Pease, Herbert D. |
| 1906 | Norton, Nathaniel R. | 1913 | Pease, Marshall C., Jr. |
| 1897 | Noyes, William B. | 1898 | Peck, Charles H. |
| 1908 | Nutt, John J. | 1886 | Peckham-Murray, Grace |
| 1912 | Oastler, Frank R. | 1898 | Pedersen, James |
| 1918 | Oberndorf, Clarence P. | 1904 | Pedersen, Victor C. |
| 1910 | Ochs, Benjamin F. | 1895 | Peet, Edward W. |
| 1885 | Offenbach, Robert | 1923 | Peightal, Thomas C. |
| 1904 | Ogilvy, Charles | 1919 | Pellini, Emil J. |
| 1906 | Oppenheimer, Bernard S. | 1923 | Penfield, Wilder G. |
| 1912 | Oppenheimer, Edgar D. | 1922 | Perkins, C. Winfield |
| 1907 | Oppenheimer, Seymour | 1917 | Perrone, Ettore |
| 1910 | Orgel, David H. | 1905 | Peterson, Edward W. |
| 1904 | Osgood, Alfred T. | 1888 | Peterson, Frederick |
| 1908 | Osgood, Charles | 1922 | Pfeiffer, William |
| 1918 | Osnato, Michael | 1912 | Phelps, Gouverneur M. |
| 1911 | Ottenberg, Reuben | 1921 | Philips, Carlin |
| 1908 | Oulman, Ludwig | 1922 | Philips, Herman B. |
| 1909 | Packard, Maurice | 1886 | Phillips, Wendell C. |
| 1913 | Packer, Flavius | 1922 | Phillips, W. Gray, Jr. |
| 1906 | Page, John R. | 1922 | Pickhardt, Otto C. |
| 1919 | Painter, Henry McM. | 1923 | Pierson, Richard N. |
| 1921 | Palefski, Israel O. | 1904 | Pinkham, Edward W. |
| 1921 | Palmer, Arthur | 1910 | Pisko, Edward |
| 1922 | Palmer, Walter W. | 1911 | Plummer, Harry E. |
| 1923 | Pardee, Harold E. B. | 1895 | Polak, John O. |
| 1923 | Pardee, Irving H. | 1920 | Poll, Daniel |
| 1892 | Park, William H. | 1924 | Pollak, Alfred W. |
| 1906 | Parker, Ransom J. | 1891 | Pollitzer, Sigmund |
| 1906 | Parodi, Teofilo | 1919 | Pond, Erasmus A. |
| 1908 | Parounagian, Mihran B. | 1904 | Poole, Eugene H. |
| 1922 | Parsons, William B., Jr. | 1891 | Porter, William H. |
| 1878 | Partridge, Edward L. | 1924 | Potter, Philip C. |
| 1911 | Pascal, Henry S. | 1913 | Pou, Robert L. |
| 1904 | Patterson, Henry S. | 1922 | Price, Joseph |
| 1894 | Payne, S. McAllister | 1893 | Pritchard, William B. |
| | | 1894 | Pulley, William J. |

1915	Pumyea, Peter C.	1919	Rimer, Edward S.
1902	Putnam, Charles R. L.	1917	Ringer, Adolph I.
1922	Pyle, Edwin	1922	Ritter, Henry H.
1884	Quackenbos, John D.	1907	Robbins, Felicia A.
1921	Quick, Douglas A.	1919	Roberts, Dudley De V.
1911	Quimby, A. Judson	1923	Roberts, George W.
1889	Quinlan, Francis J.	1910	Roberts, Percy W.
1891	Quintard, Edward	1923	Robertson, Victor A.
1921	Rabe, Rudolph F.	1901	Robinovitch, Louise G.
1921	Rabinowitz, Meyer A.	1923	Robins, Bernard L.
1907	Rae, John B.	1912	Robinson, John A.
1922	Rafsky, Henry A.	1910	Robinson, Meyer R.
1918	Ramirez, Maximilian A.	1910	Robinson, William J.
1916	Ramsdell, Edwin G.	1905	Rogers, John
1924	Randall, John A.	1919	Rohde, Max S.
1920	Rathbun, Nathaniel P.	1915	Rongy, Abraham J.
1925	Ratner, Bret	1908	Roper, Joseph C.
1918	Ratnof, Hyman L.	1916	Rosen, Isadore
1914	Rawls, Reginald M.	1906	Rosenberg, Leopold
1917	Ream, Frederick K.	1911	Rosenbluth, Benjamin
1911	Reese, Robert G.	1922	Rosenbluth, Milton B.
1914	Rehling, Martin	1923	Rosenheck, Charles
1904	Reich, Adolph	1922	Rosensohn, Meyer
1921	Reid, John J., Jr.	1906	Rosenthal, Max
1914	Reilly, Thomas F.	1922	Rosett, Joshua
1924	Reiss, Joseph	1917	Ross, Carl A.
1914	Remer, John	1918	Rost, William L.
1912	Reuben, Mark S.	1919	Rostenberg, Adolph
1925	Reynolds, Frederick P.	1906	Roth, Henry
1886	Rhein, Meyer L.	1916	Rothwell, John J.
1887	Rice, Clarence C.	1912	Rowland, Harry H.
1921	Rice, Frederick W.	1923	Rubin, Isidor C.
1904	Richards, John D.	1885	Rudisch, Julius
1910	Richards, John H.	1921	Rulison, Ray H.
1921	Richardson, Henry B.	1908	Russell, James I.
1908	Riesenfeld, Edwin A.	1922	Russell, Thomas H.
1909	Rieser, Willy	1909	Ryder, George H.
1919	Riley, Henry Alsop	1887	Sachs, Bernard

- 1915 St. John, Fordyce B.
 1920 St. Lawrence, William P.
 1918 Salisbury, Lucius A.
 1916 Salmon, Thomas W.
 1925 Salzer, Benjamin
 1918 Sammis, Jesse F.
 1913 Samuels, Bernard
 1923 Sanders, Theodore M.
 1921 Sands, Irving J.
 1921 Santee, Harold E.
 1906 Saril, H. Davison
 1917 Sartorius, August M.
 1918 Satenstein, David L.
 1905 Satterlee, G. Reese
 1882 Satterthwaite, Thomas E.
 1923 Sauer, Paul Kurt
 1919 Saunders, Truman L.
 1920 Sautter, Carl Marion
 1915 Savini, Carlo
 1887 Sayre, Reginald H.
 1918 Seadron, Samuel J.
 1918 Seal, J. Coleman
 1911 Schapira, Samuel W.
 1917 Scheer, Max
 1923 Schiller, Abraham N.
 1904 Schlapp, Max G.
 1903 Schley, Winfield S.
 1918 Schlivek, Kaufman
 1911 Schloss, Oscar M.
 1908 Schnepel, George A.
 1912 Schoenberg, Mark J.
 1894 Schram, Charles
 1918 Schroeder, Louis C.
 1920 Schulman, Maximilian
 1912 Schultze, Ernest C.
 1915 Schwartz, Hans J.
 1906 Schwarz, Herman
 1922 Schwatt, Herman
 1918 Schweikart, Frederick J.
 1917 Schwerdtfeger, Otto M.
 1922 Scott, Augusta
 1907 Scott, George Dow
 1925 Scott, James R.
 1915 Scott, Richard J. E.
 1911 Scruton, William A.
 1891 Seabrook, Harry H.
 1885 Seaman, Louis L.
 1925 Seeceof, David P.
 1914 Seff, Isadore
 1855 Seibert, August
 1922 Selinger, Jerome
 1904 Semken, George H.
 1911 Senior, Harold D.
 1924 Seymour, Nan Gilbert
 1879 Shaffer, Newton M.
 1921 Shailer, Sumner
 1908 Shannon, John R.
 1902 Sharp, J. Clarence
 1915 Sharpe, Norman
 1914 Sharpe, William
 1920 Shattuck, Howard F.
 1905 Shearer, Leander H.
 1918 Sheehan, J. Eastman
 1907 Sheffield, Herman F.
 1905 Shelby, Edmund P.
 1910 Shine, Francis W.
 1918 Shlenker, Milton A.
 1924 Shufelt, William A.
 1904 Shultz, Peter David
 1880 Sicard, Montgomery H.
 1893 Silver, Henry Mann
 1921 Siris, Irwin E.
 1912 Sittenfield, Maurice J.
 1921 Skinner, Clarence E.

1922	Slattery, George N.	1885	Starr, M. Allen
1909	Smart, Isabelle Thompson	1889	Stearns, Henry S.
1923	Smith, Alan DeForest	1880	Stedman, Thomas L.
1914	Smith, Charles Hendee	1908	Steel, George Edwin
1916	Smith, Clarence H.	1904	Steese, Edwin S.
1902	Smith, Ernest Ellsworth	1922	Steffen, Walter C. A.
1922	Smith, Goodrich T.	1908	Stein, Arthur
1901	Smith, Harmon	1909	Stein, Sydney A.
1920	Smith, Homer E.	1918	Steinach, William
1918	Smith, J. Morrissett	1925	Steiner, Joseph M.
1924	Smith, James W.	1899	Stella, Antonio
1919	Smith, Martin De F.	1904	Stephens, Franklin M.
1916	Smith, Morris K.	1924	Stephens, Richmond
1923	Sneed, William L.	1917	Stephenson, Junius W.
1918	Snow, William F.	1925	Stepita, C. Travers
1923	Snyder, Orlow C.	1905	Stern, Abram Richard
1913	Snyder, R. Garfield	1917	Stern, Adolph
1904	Solley, Fred P.	1910	Stern, Maximilian
1905	Solley, John B., Jr.	1919	Stetson, Rufus E.
1893	Sondern, Frederic E.	1907	Stetten, De Witt
1925	Sonnenschein, Harry D.	1909	Stevens, Alex. Raymond
1910	Soresi, Angelo L.	1919	Stevens, Charles W.
1924	Soule, William L.	1916	Stevenson, George
1902	Sour, Bernard	1895	Stewart, George David
1894	Southworth, Thomas S.	1918	Stewart, John D.
1922	Sovak, Francis W.	1912	Stewart, William H.
1921	Spaulding, Edith Rogers	1911	Stillman, Alfred, 2d.
1917	Spaulding, Harry Van N.	1923	Stillman, Edgar
1918	Spencer, Henry J.	1918	Stillman, Ernest G.
1920	Spiegel, Leo	1911	Stillman, Ralph G.
1923	Spielberg, William	1896	Stillwell, John E.
1922	Spies, Edwin A.	1887	Stimson, Charles W.
1896	Squibb, Edward H.	1921	Stimson, Philip M.
1901	Squier, J. Bentley	1922	Stivelman, Barnet P.
1922	Stark, Jesse B.	1917	Stokes, Charles F.
1912	Stark, Meyer M.	1898	Stone, William S.
1910	Stark, Morris	1920	Stookey, Byron P.
		1909	Storey, Thomas A.
		1924	Stout, Arthur Purdy

- | | | | |
|------|------------------------|------|--------------------------|
| 1919 | Stowell, David D. | 1904 | Thompson, Hugh C. |
| 1890 | Stowell, William L. | 1885 | Thompson, W. Gilman |
| 1918 | Strachstein, Abraham | 1906 | Thomson, Edgar S. |
| 1904 | Strang, Walter W. | 1908 | Thorne, Victor C. |
| 1908 | Strauss, Israel | 1922 | Thornley, Josiah P. |
| 1913 | Strobell, Charles W. | 1916 | Throne, Binford |
| 1917 | Strong, Samuel M. | 1904 | Thurber, Samuel W. |
| 1887 | Stubenbord, William | 1910 | Tieck, Gustav J. E. |
| 1904 | Studdiford, William E. | 1915 | Tilney, Frederick |
| 1908 | Sturges, Leigh F. | 1901 | Tilton, Benjamin T. |
| 1901 | Sturmdorf, Arnold | 1906 | Timme, Walter |
| 1919 | Sturtevant, Mills | 1906 | Titus, Edward C. |
| 1912 | Sullivan, Raymond P. | 1921 | Titus, Norman E. |
| 1902 | Sumner, Albert E. | 1922 | Tobin, Thomas J. |
| 1909 | Sutherland, Fred B. | 1909 | Tompkins, Walstein M. |
| 1908 | Sweeny, Thompson | 1891 | Torek, Franz J. A. |
| 1889 | Swift, Edwin E. | 1895 | Tousey, Sinclair |
| 1890 | Swift, George M. | 1908 | Tovey, David W. |
| 1916 | Swift, Homer F. | 1902 | Townsend, Terry M. |
| 1888 | Syms, Parker | 1902 | Tracy, Ira Otis |
| 1906 | Talmey, Bernard S. | 1925 | Traub, Eugene F. |
| 1904 | Taylor, Alfred S. | 1907 | Travell, J. Willard |
| 1922 | Taylor, Charles G. | 1917 | Truesdell, Edward D. |
| 1921 | Taylor, Fenton | 1913 | Turek, Fenton B. |
| 1901 | Taylor, Fielding L. | 1906 | Turnure, Percy R. |
| 1898 | Taylor, Howard C. | 1919 | Tyson, Cornelius J. |
| 1917 | Taylor, Joseph C. | 1890 | Tyson, Henry H. |
| 1920 | Taylor, Kenneth | 1917 | Unger, Arthur S. |
| 1904 | Taylor, Thomas M. | 1924 | Unger, James Samuel |
| 1916 | Tenner, Arthur S. | 1918 | Unger, Max |
| 1925 | Tenney, Charles F. | 1920 | Urquhart, Howard D. |
| 1897 | Terriberry, Joseph F. | 1912 | Valentine, Julius J. |
| 1918 | Terry, Ira B., Jr. | 1910 | Van Beuren, Frederick T. |
| 1894 | Teschner, Jacob | 1906 | Van Cott, Joshua M. |
| 1911 | Thacher, Henry C. | 1919 | Vandegrift, George W. |
| 1910 | Theobald, Carl | 1924 | Van Derwerker, Earl E. |
| 1890 | Thomas, Allen M. | 1922 | Van Etten, Nathan B. |
| 1924 | Thomas, Joseph S. | 1920 | Van Etten, Royal C. |
| 1904 | Thomas, William S. | | |

1906	Van Ingen, Philip	1925	Washburn, Arthur L.
1906	Van Wagenen, Cornelius D.	1921	Washton, Jacob
1908	Vaughan, Harold S.	1895	Waterman, James S.
1915	Vaughan, John C.	1920	Watson, Cassius H.
1917	Vedder, Harmon A.	1921	Webster, David H.
1919	Vietor, John A.	1919	Wechsler, Israel S.
1896	Vineberg, Hiram N.	1886	Weeks, John E.
1922	Vinton, Cadwallader C.	1920	Weeks, Webb W.
1914	Virden, John E.	1910	Weidler, Walter B.
1913	Vogel, Karl M.	1922	Weil, Henry L.
1903	Voislowsky, Antonie P.	1908	Weinberger, William
1923	von Lackum, Herman LeRoy	1910	Weingarten, Frederick S.
1925	Von Sholly, Anna Irene	1912	Weinstein, Harris
1921	Voorhees, Irving W.	1880	Weir, Robert F.
1902	Voorhees, James D.	1917	Weiss, Ludwig
1908	Vosburgh, Arthur S.	1906	Welch, John E.
1910	Wachsmann, Siegfried	1909	Welker, Franklin
1920	Wadhams, Robert P.	1894	Welt-Kakels, Sara
1893	Walker, John B.	1914	Wessler, Harry
1903	Wallace, Charlton	1916	West, Davenport
1904	Wallace, George B.	1897	West, James N.
1908	Waller, Newton B.	1911	Wheeler, John M.
1908	Wallin, Alfred C.	1915	Whipple, Allen O.
1910	Wallin, Mathilda K.	1915	Whitbeck, Brainerd H.
1904	Walsh, James J.	1911	White, Francis W.
1920	Walsh, Robert E.	1920	White, James W.
1904	Walsh, Simon J.	1882	White, John Blake
1891	Walter, Josephine	1920	White, William C.
1919	Walter, Milton R.	1906	Whiting, Frederick
1920	Walzer, Abraham	1920	Whitman, Armitage
1904	Wandless, Henry W.	1891	Whitman, Royal
1901	Ward, Freeman F.	1904	Wiener, Alfred
1895	Ward, George Gray	1914	Wiener, Herbert J.
1908	Ward, Wilbur	1900	Wiener, Joseph
1901	Ware, Martin W.	1883	Wiener, Richard G.
1914	Warren, Luther F.	1908	Wiener, Solomon
1897	Warsaw, M. Claudius	1918	Wiggers, August F. A.
		1918	Wight, Jarvis S.

1905	Wightman, Orrin S.	1922	Wolf, George D.
1907	Wilcox, Herbert B.	1912	Wolf, Heinrich Franz
1914	Wilensky, Abraham O.	1899	Wolff, Julius
1922	Willard, Luvia Margaret	1901	Wollstein, Martha
1893	Willard, Thomas H.	1911	Wood, Francis C.
1901	Williams, Anna W.	1924	Wood, Thomas D.
1903	Williams, Charles M.	1908	Woodman, John
1918	Williams, Frankwood E.	1910	Woodruff, I. Ogden
1916	Williams, Horatio B.	1904	Woolley, Scudder J.
1904	Williams, Linsly R.	1891	Woolsey, George
1886	Williams, Mark H.	1896	Wootton, Herbert W.
1923	Williams, Percy H.	1917	Worcester, James N.
1905	Williams, William R.	1917	Wright, Arthur M.
1918	Williamson, Hervey C.	1918	Wyekoff, John H.
1905	Wilner, Anna S.	1910	Wyeth, George A.
1918	Wilson, Arthur S.	1889	Wylie, Robert H.
1900	Wilson, Frederic N.	1924	Wynne, Shirley W.
1920	Wilson, John E.	1904	Yankauer, Sidney
1917	Wilson, May G.	1908	Yeomans, Frank C.
1906	Wilson, Robert J.	1921	de Yoanna, Gaetano
1921	Wilson, William A.	1893	Young, John Van Doren
1914	Wing, Lucius A.	1908	Zabriskie, Edwin G.
1909	Wise, Fred	1921	Zadek, Isadore
1924	Witt, Dan Hiter	1913	Zingher, Abraham
1922	Wolf, Charles	1909	Zipser, Jacques E.

FELLOWS RESIDING OUTSIDE NEW YORK CITY

1923	Ackerman, James F., 1010 Grand Ave., Asbury Park, N. J.
1906	Adler, Herman M., 721 So. Wood St., Chicago, Ill.
1903	Adrianse, Vanderpoel, The Perch, Williamstown, Mass.
1922	Aikman, John, 184 Alexander St., Rochester, N. Y.
1919	Allen, Henry Willard, Ridgefield, Conn.
1911	Almgren-Dederer, Ebba E., Wisconsin Industrial Home for Women, Taycheedah, Wis.
1907	Amesse, John W., 624 Metropolitan Bldg., Denver, Colo.
1884	Andrews, Joseph A., Santa Barbara, Cal.
1888	Armstrong, Samuel T., Hillbourne Club, Katonah, N. Y.
1906	Arnold, Ernst H., 1460 Chapel St., New Haven, Conn.

- 1908 Avery, John Waite, 1780 Highland Ave., Hollywood, Cal.
 1882 Bacon, Gorham, Rhu Cottage, Yarmouthport, Mass.
 1904 Baker, Sara Josephine, Long Ridge, Stamford, Conn.
 1916 Baldwin, Edward R., Saranac Lake, N. Y.
 1920 Banker, George T., 1060 East Jersey St., Elizabeth, N. J.
 1906 Barnum, Merritt W., 7 and 9 Ellis Place, Ossining, N. Y.
 1924 Barr, David P., 600 So. Kingshighway, St. Louis, Mo.
 1913 Barshell, Samuel, Bez. Lichtenauergasse, 15, Vienna, Austria.
 1915 Bartholomew, Henry S., Napanock, Ulster Co., N. Y.
 1914 Beck, August Leo, Professional Bldg., New Rochelle, N. Y.
 1897 Bell, J. Finley, Englewood, N. J.
 1921 Benson, Arthur W., 2 St. Paul's Place, Troy, N. Y.
 1908 Black, John Fielding, 247 Main St., White Plains, N. Y.
 1920 Blaisdell, Russell E., Kings Park, L. I., N. Y.
 1918 Blake, Eugene M., 55 Trumbull St., New Haven, Conn.
 1924 Blosser, Roy, 230 Thayer St., Providence, R. I.
 1908 Blumer, George, 841 Whitney Ave., New Haven, Conn.
 1919 Bonnell, Clarence H., Boston Post Road, Rye, N. Y.
 1897 Booth, Burton S., 60 Second St., Troy, N. Y.
 1916 Bortone, Frank, 809 Montgomery St., Jersey City, N. J.
 1907 Bradford, Stella S., 16 Seymour St., Montclair, N. J.
 1907 Brown, David Chester, 330 Main St., Danbury, Conn.
 1915 Brown, Lawrason, Saranac Lake, N. Y.
 1920 Brundage, Walter H., 205 Pelhamdale Ave., Pelham, N. Y.
 1880 Brush, Edward F., 330 So. Fifth Ave., Mt. Vernon, N. Y.
 1910 Buckmaster, Clarence W., 80 Ashburton Ave., Yonkers, N. Y.
 1913 Bulkley, Kenneth, 420 Syndicate Bldg., Minneapolis, Minn.
 1879 Bullard, William E., Prospect Ave., Larchmont, N. Y.
 1912 Bumsted, Clarence van R., 235 Grafton Ave., Newark, N. J.
 1914 Burnap, Sidney R., 3087 Wilshire Blvd., Los Angeles, Cal.
 1917 Butler, Eustace C., 249 Bloomfield Ave., Caldwell, N. J.
 1891 Cabot, John, 42 King Ave., Weehawken, N. J.
 1890 Campbell, Archibald M., 36 First Ave., Mt. Vernon, N. Y.
 1904 Canfield, R. Bishop, Ann Arbor, Mich.

- 1921 Carlisle, John H., 129 Prospect St., Passaic, N. J.
- 1908 Carter, C. Edgerton, Brockman Bldg., Los Angeles, Cal.
- 1909 Castelli, Alfonso, 14 Via Lombardia, Rome, Italy.
- 1923 Cavanaugh, Thomas E., 293 Bridge St., Springfield, Mass.
- 1895 Chambers, Talbot R., 931 Bergen Ave., Jersey City, N. J.
- 1906 Chapman, Charles F., Mt. Kisco, N. Y.
- 1912 Chapman, Sophia U., 165 E. 4th St., Oswego, N. Y.
- 1924 Charlton, Herbert R., 89 Pondfield Road, Bronxville, N. Y.
- 1911 Chittenden, Arthur S., 109 Oak St., Binghamton, N. Y.
- 1925 Christensen, Frederick C., 2250 Kinzie Ave., Racine, Wis.
- 1911 Clock, Ralph O., Pearl River, N. Y.
- 1897 Comstock, George F., Saratoga Springs, N. Y.
- 1907 Conaway, Walt P., 1723 Pacific Ave., Atlantic (
- 1904 Connell, Karl, Presbyterian Hospital, Omaha, Neb.
- 1922 Conrad, Edgar K., Hospital Ave., Hackensack, N. J.
- 1920 Corbusier, Harold D., 612 Park Ave., Plainfield, N. J.
- 1909 Corwin, Arthur S., Rye, N. Y.
- 1906 Curry, Grove P. M., Mt. Kisco, N. Y.
- 1910 Davison, Wesley T., 1023 Belmont Ave., Victoria, B. C.
- 1911 Day, Fessenden L., 819 Myrtle Ave., Bridgeport, Conn.
- 1911 Dayton, Hughes, Barney Park, Irvington-on-Hudson, N. Y.
- 1879 De Garmo, William B., 61 Palmer Ave., Larchmont, N. Y.
- 1911 Derby, Richard, Oyster Bay, L. I., N. Y.
- 1916 De Vausney, Winfield S., 2 Lombardy St., Newark, N. J.
- 1915 Dieffenbach, Richard H., 570 Mt. Prospect Ave., Newark, N. J.
- 1904 Divine, Alice, Ellenville, N. Y.
- 1895 Dobson, William G., 35 Market St., Poughkeepsie, N. Y.
- 1912 Drake, Bertrand F., 75 Main St., New Rochelle, N. Y.
- 1921 Durham, Herbert A., 527 Wilkinson St., Shreveport, La.
- 1924 Dye, John Sinclair, 111 W. Main St., Waterbury, Conn.
- 1917 Eaton, Alvin R., Jr., 1157 E. Jersey St., Elizabeth, N. J.
- 1920 Eaton, Henry Douglas, 1136 W. Sixth St., Los Angeles, Cal.
- 1921 Edwards, James B., 144 Woodridge Place, Leonia, N. J.
- 1899 Elliott, George T., The Cape, E. Otisfield, Oxford, Me.
- 1906 Estes, William L., South Bethlehem, Pa.
- 1923 Farnell, Frederick J., 598 Angell St., Providence, R. I.

- 1885 Farrington, William H., Raubsville, Pa.
- 1922 Fauntleroy, Archibald M., P. O. Box E, Ossining, N. Y.
- 1891 Ferris, Albert W., The Glen Springs, Watkins, N. Y.
- 1922 Finke, George W., 237 State St., Hackensack, N. J.
- 1911 Fitz, George W., Peconic, L. I., N. Y.
- 1912 Fitzgerald, Clara Pauline, 137 Pleasant St., Worcester, Mass.
- 1920 Fleischner, Emanuel C., 350 Post St., San Francisco, Cal.
- 1919 Flynn, Thomas J., Surgeon General's Office, Washington, D. C.
- 1918 Ford, Clyde E., 2417 Prospect Ave., Cleveland, Ohio.
- 1912 Fuchsius, John H., 90 Centre Ave., New Rochelle, N. Y.
- 1889 Fuller, Eugene, care Fifth Avenue Bank, 530 Fifth Ave., New York, N. Y.
- 1910 Funk, Joseph, 615 Elizabeth Ave., Elizabeth, N. J.
- 1913 Garcin, Ramon D., 2618 E. Broad St., Richmond, Va.
- 1920 Gardner, Charles W., 449 State St., Bridgeport, Conn.
- 1922 Garvin, William C., Binghamton State Hospital, Binghamton, N. Y.
- 1915 Getty, Samuel E., 84 Ashburton Ave., Yonkers, N. Y.
- 1925 Ginsberg, George, 624 Bloomfield St., Hoboken, N. J.
- 1922 Glazebrook, Francis H., 171 South St., Morristown, N. J.
- 1908 Goodridge, Frederic G., Pomfret Centre, Conn.
- 1916 Gordinier, Hermon C., 89 Fourth St., Troy, N. Y.
- 1881 Gorton, Orren A., P. O. Box 463, Sherburne, N. Y.
- 1890 Greene, William F., 25 So. First St., Mt. Vernon, N. Y.
- 1908 Greenway, James C., 400 Prospect St., New Haven, Conn.
- 1901 Griffith, Frederic, 2031 Columbia Ave., Philadelphia, Pa.
- 1909 Guion, Clarence C., 175 Centre Ave., New Rochelle, N. Y.
- 1908 Guntzer, John Henry, 51 No. Regent St., Port Chester, N. Y.
- 1919 Hallett, Frederick S., 200 Passaic St., Hackensack, N. J.
- 1920 Hammond, Robert B., Sterling Ave., White Plains, N. Y.
- 1887 Hance, Irwin H., Lakewood, New Jersey.
- 1914 Hannock, Elwin W., 363 State St., Albany, N. Y.
- 1919 Hartshorn, Willis E., 67 Trumbull St., New Haven, Conn.
- 1921 Harvey, Samuel Clark, New Haven Hospital, New Haven, Conn.

- 1925 Haseltine, Sherwin L., 410 Westminster Ave., Elizabeth, N. J.
- 1915 Hawley, George W., 881 Lafayette St., Bridgeport, Conn.
- 1913 Hebert, Paul Z., 5813 So. Haas Ave., Los Angeles, Cal.
- 1922 Heddens, Vernon O., 607 Citizens Svcs. Bldg., Pasadena, Cal.
- 1910 Henderson, Alfred C., 55 Glenbrook Road, Stamford, Conn.
- 1911 Herring, Robert A., McAdoo Bldg., Greensboro, N. C.
- 1915 Hicks, Horace M., 19 Division St., Amsterdam, N. Y.
- 1912 Hoagland, Bonn. W., Barron Ave., Woodbridge, N. J.
- 1915 Holding, Arthur F., Wellington Hotel, Albany, N. Y.
- 1901 Holmes, Edwin, Hotel Alcazar, St. Augustine, Fla.
- 1918 Horn, James F., 139 South St., Morristown, N. J.
- 1905 Hotchkiss, Lucius W., San Marcos Bldg., Santa Barbara, Cal.
- 1912 Hotwet, Henry A., Weehawken, New Jersey.
- 1915 Howland, De Ruyter, Stratford, Connecticut.
- 1904 Howland, John, Johns Hopkins Hospital, Baltimore, Md.
- 1906 Howley, Bartholomew M., 419 George St., New Brunswick, N. J.
- 1916 Hughes, Frederic J., 706 Park Ave., Plainfield, N. J.
- 1888 Hume, William A., 63 Seabrook Rd., Forest Hills, N. Y.
- 1923 Hutchison, Fred R., 803 Washington St., Huntingdon, Pa.
- 1917 Jackson, Chevalier, 128 S. 10th St., Philadelphia, Pa.
- 1924 Jackson, Elmer C., 98 Washington St., East Orange, N. J.
- 1911 Jacobson, Frederick C., 1074 Broad St., Newark, N. J.
- 1910 Jaffin, Abraham E., 41 Emory St., Jersey City, N. J.
- 1908 Jameson, James W., 5 S. State St., Concord, N. H.
- 1912 Jean, George W., San Marcos Bldg., Santa Barbara, Cal.
- 1906 Jennings, Walter B., Connecticut State Hospital, Middletown, Conn.
- 1922 Jessup, Everett C., Roslyn, L. I., New York.
- 1910 Johnson, Frederic M., 25 Morris St., Yonkers, N. Y.
- 1921 Joseph, Morris, 271 Lexington Ave., Passaic, N. J.
- 1890 Kammerer, Frederic J., Lohn Kehrsatz, Bern, Switzerland.
- 1906 Kann, Ulysses S., 77 Main St., Binghamton, N. Y.

- 1915 Keller, Franklin J., 795 Broadway, Paterson, N. J.
 1905 Keppler, Carl R., 138 Clinton Ave., Newark, N. J.
 1923 Klaus, Henry, 435 Palisade Ave., Union City, N. J.
 1892 Klotz, Hermann G., 134 West Post Rd., White Plains, N. Y.
 1922 Knapp, Richard E., 25 Hudson St., Hackensack, N. J.
 1909 Koch, Louis A., 16 Chestnut St., Newark, N. J.
 1907 Lambert, Frederick E., 157 Ocean Ave., Jersey City, N. J.
 1916 Lambert, Robert A., Faculdade De Medicina, Sao Paulo, Brazil.
 1916 Lane, John E., 59 College St., New Haven, Conn.
 1921 Lange, Louis C., 295 Summit Ave., Union City, N. J.
 1912 Lathrope, George H., 6 Altamont Court, Morristown, N. J.
 1917 Lavinder, Claude H., U. S. Marine Hospital, Stapleton, N. Y.
 1923 Lawrence, Watson A., 204 Martine Ave., White Plains, N. Y.
 1910 Leake, James Payton, Hygienic Laboratory, Washington, D. C.
 1918 Lee, Edward W., 19 Center St., Randolph, N. Y.
 1908 Littell, Elton G., 149 Park Avenue, Yonkers, N. Y.
 1924 Littwin, Charles, Edgewater, N. J.
 1917 Livengood, Horace R., 1105 E. Jersey St., Elizabeth, N. J.
 1906 Long, Eli, Lafayette Ave., Lakewood, N. J.
 1912 Longcope, Warfield T., Johns Hopkins Hospital, Baltimore, Md.
 1924 Luippold, Eugene John, 85 Columbia Terrace, Weehawken, N. J.
 1904 Lyman, Francis R., Broadway, Hastings-on-Hudson, N. Y.
 1904 Lynch, Robert J., 52 Courtland St., Bridgeport, Conn.
 1909 MacCallum, William G., Johns Hopkins Hospital, Baltimore, Md.
 1924 McCann, William S., School of Med., Univ. of Roch., Rochester, N. Y.
 1908 McGavock, Edward P., Med. Arts Bldg., E. Franklin St., Richmond, Va.
 1885 McKim, W. Duncan, 1701 18th St., N.W., Washington, D. C.
 1897 Mann, John, Old Westbury, Nassau Co., N. Y.

- 1913 Marsh, Elias Joseph, 400 Van Houten St., Paterson, N. J.
- 1884 Mendelson, Walter, 639 Church Lane, Germantown, Phila., Pa.
- 1923 Mendez, Albert A., Punta San Juan, Cuba.
- 1919 Mendillo, Anthony J., 42 College St., New Haven, Conn.
- 1905 Meyer, Adolf, Johns Hopkins Univ., Baltimore, Md.
- 1907 Mial, L. L. May, 38 Elm St., Morristown, N. J.
- 1905 Miller, Ansel I., Brattleboro, Vermont.
- 1910 Miller, Charles G., Grand View Ave., Rye, N. Y.
- 1910 Milne, Lindsay S., 1800 Federal Res. Bldg., Kansas City, Mo.
- 1919 Miner, Donald, 394 Bergen Ave., Jersey City, N. J.
- 1917 Mitchell, Charles R., 311 Broadway, Paterson, N. J.
- 1891 Moffat, Henry, 139 Park Ave., Yonkers, N. Y.
- 1916 Morales-Macedo, Carlos, Mogollon 265, P. O. B. 816, Lima, Peru.
- 1912 Morgan, William Gerry, 1624 Eye St., Washington, D. C.
- 1922 Morrill, Ashley B., Bronxville, N. Y.
- 1921 Morrissey, Michael J., 18 Asylum St., Hartford, Conn.
- 1916 Mott, Walter Wesley, 43 Waller Ave., White Plains, N. Y.
- 1913 Mount, Walter B., 21 Plymouth St., Montclair, N. J.
- 1916 Nelson, Aaron, 462 Jersey Ave., Jersey City, N. J.
- 1916 Neuman, Leo H., 194 State St., Albany, N. Y.
- 1923 Neumann, Theodore W., Central Valley, N. Y.
- 1908 Newman, Emanuel D., 81 New St., Newark, N. J.
- 1902 Nicoll, Matthias, Jr., N. Y. State Dept. of Health, Albany, N. Y.
- 1897 Nisbet, James D., Van Wyck, So. Carolina.
- 1913 Ober, George E., 144 Golden Hill St., Bridgeport, Conn.
- 1906 Oertel, Horst, Royal Victoria Hospital, Montreal, Canada.
- 1883 Olds, Frank W., Williamstown, Mass.
- 1910 Oppenheimer, Frederick G., Arcadia Pl., San Antonio, Texas.
- 1897 Orleman-Robinson, Daisy M., U.S.P.H. Service, 16 Seventh St., S.W., Washington, D. C.
- 1871 Packard, Charles W., 2149 Elm St., Stratford, Conn.
- 1915 Pappenheimer, Alwin M., Hartsdale, N. Y.
- 1912 Parker, Edward O., Greenwich, Conn.

- 1921 Parker, Jason S., 7 Chester Ave., White Plains, N. Y.
- 1894 Parry, Angenette, care W. H. Parry, 222 Front St., Rome, N. Y.
- 1909 Parry, Eleanor, care W. H. Parry, 222 Front St., Rome, N. Y.
- 1896 Parsons, Ralph W., Ossining, N. Y.
- 1893 Paton, Stewart, Princeton, N. J.
- 1920 Patterson, Daniel C., 1337 Main St., Bridgeport, Conn.
- 1905 Peek, George A., Professional Bldg., Roosevelt Sq., New Rochelle, N. Y.
- 1880 Perry, John G., 371 Commonwealth Ave., Boston, Mass.
- 1924 Phillips, Frank L., 413 Temple St., New Haven, Conn.
- 1898 Pilgrim, Charles W., Central Valley, N. Y.
- 1907 Proctor, James W., Englewood, N. J.
- 1905 Prout, Thomas P., Fair Oaks, Summit, N. J.
- 1920 Pyle, Wallace, 15 Exchange Pl., Jersey City, N. J.
- 1909 Quinn, Stephen T., 326 South Broad St., Elizabeth, N. J.
- 1922 Rainey, John J., 104 Second St., Troy, N. Y.
- 1925 Randel, William A., 10 S. 3rd Ave., Mount Vernon, N. Y.
- 1909 Randolph, John M., Rahway, N. J.
- 1912 Rayevsky, Charles, Liberty, N. Y.
- 1919 Raynor, Mortimer W., Kings Park, L. I., N. Y.
- 1909 Reid, George C., 219 N. Washington St., Rome, N. Y.
- 1916 Reynolds, Harry S., South Manchester, Conn.
- 1905 Riggs, Austen Fox, Stockbridge, Mass.
- 1924 Robbin, Lewis, 80 Millington Ave., Newark, N. J.
- 1917 Robert, Daniel R., New Lebanon Center, N. Y.
- 1925 Roberts, Edward R., 144 Golden Hill St., Bridgeport, Conn.
- 1904 Robertson, Joseph A., 918 Mercantile Bk. Bldg., Dallas, Texas.
- 1920 Robinson, Horace Eddy, Pleasantville, N. Y.
- 1920 Roemer, Jacob, 213 Broadway, Paterson, N. J.
- 1924 Rooney, James Francis, 132 Lancaster St., Albany, N. Y.
- 1896 Rushmore, Edward C., Tuxedo Park, N. Y.
- 1920 Russell, Thomas H., 57 Trumbull St., New Haven, Conn.
- 1913 Russell, Worthington S., Woodbury Falls, Orange Co., N. Y.
- 1905 Sadlier, James E., 295 Mills St., Poughkeepsie, N. Y.

- 1907 Sauer, J. George, P. O. Box 253, Passagrille, Fla.
- 1908 Schlichter, Charles H., 556 N. Broad St., Elizabeth, N. J.
- 1914 Scofield, Raymond B., 150 Elliott Ave., Yonkers, N. Y.
- 1884 Scott, George, 12 So. Montgomery Ave., Atlantic City,
N. J.
- 1909 Shangle, Milton A., 1143 E. Jersey St., Elizabeth, N. J.
- 1921 Shapiro, Louis G., 375 Broadway, Paterson, N. J.
- 1904 Sharp, Edward A., 81 Linwood Ave., Buffalo, N. Y.
- 1909 Shenier, Leo H., 50 Lincoln Ave., Grantwood, N. J.
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ark, N. J.
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- 1920 Sinnott, John J., 10 So. 3rd Ave., Mt. Vernon, N. Y.
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- 1920 Snyder, William H., 202 Grand St., Newburgh, N. Y.
- 1908 Sorapure, Victor E., 49 Wimpole St., London, England.
- 1894 Spence, Daniel B., R. F. D. 2, Box 42, Morristown, N. J.
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- 1922 Stevenson, Holland N., 160 Harmon Ave., Pelham, N. Y.
- 1915 Stone, Harry Russell, Clinton, Conn.
- 1914 Stoner, George W., 84 Norwood Ave., Stapleton, S. I.,
N. Y.
- 1912 Stover, Charles, Amsterdam, N. Y.
- 1907 Stratton, Edward A., 173 Main St., Danbury, Conn.
- 1917 Sweet, Charles C., 13 Maple Place, Ossining, N. Y.

- 1920 Taylor, George Herbert, Maplewood, N. J.
- 1918 Terry, Benjamin T., Vanderbilt Sch. of Med., Dept. of Path., Nashville, Tenn.
- 1914 Thalhimer, William, Columbia Hospital, Milwaukee, Wis.
- 1918 Thoms, Herbert, 59 College St., New Haven, Conn.
- 1907 Thomson, John J., 3 Park Ave., Mt. Vernon, N. Y.
- 1911 Tileston, Wilder, 101 Grove St., New Haven, Conn.
- 1913 Titus, Henry W., 421 Huguenot St., New Rochelle, N. Y.
- 1895 Toms, S. W. Spencer, Nyack, N. Y.
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- 1888 Van Valzah, William W., 306 Los Olivos St., Santa Barbara, Cal.
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- 1908 Vogeler, William J., 177 Palisade Ave., Yonkers, N. Y.
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- 1913 Waldron, Louis V., 27 Radford St., Yonkers, N. Y.
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- 1909 White, Davenport, 2226 Connecticut Ave., Washington, D. C.
- 1914 Wilson-Prevost, Charles A., 28 Avenue D'Jena, Paris, France.

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 1921 Woodland, Edward E., U. S. Naval Hosp., Pensacola, Fla.
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 1889 Wright, Jonathan, Windy Rock, Pleasantville, Westchester Co., N. Y.
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 1914 Yocum, Joseph G., 25 Roberts St., Middletown, N. Y.
 1910 Youmans, Vincent J., Ballston Spa., N. Y.
 1910 Young, Anna R., Maine General Hospital, Portland, Maine.
 1910 Young, Charles H., Maine General Hospital, Portland, Maine.
 1923 Yudkin, Arthur M., 257 Church St., New Haven, Conn.
 1920 Zinsser, Hans, 240 Longwood Ave., Boston, Mass.

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- 1898 Alling, Arthur N., 257 Church St., New Haven, Conn.
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 1898 Atkinson, James William, 27 Church St., Paterson, N. J.
 1912 Beard, Stanley Drew, Lederle Antitoxin Labor's., Pearl River, N. Y.
 1905 Beling, Christopher C., 111 Clinton Ave., Newark, N. J.
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 1895 Brien, William M., 449 Main St., Orange, N. J.
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 1897 Bull, Edward Leonard, 124 E. State St., Ithaca, N. Y.
 1897 Calef, J. Francis, Middletown, Conn.
 1922 Cooke, Elizabeth, Shippan Point, Stamford, Conn.
 1898 Corwin, Theodore W., 146 Second Ave., Newark, N. J.
 1904 Darnall, Wm. Edgar, 5 So. Morris Ave., Chelsea, N. J.
 1910 Davenport, Charles B., Cold Spring Harbor, N. Y., N. Y.
 1902 Demarest, Frederick F. C., 29 Academy St., Passaic, N. J.
 1897 Dickinson, Gordon K., 280 Montgomery St., Jersey City, N. J.

- 1898 Eagleton. Wells P., 15 Lombardy St., Newark, N. J .
- 1902 Emerson. Linn. Metropolitan Bldg., Orange, N. J.
- 1920 Fine. Morris, 37 Lathrop Ave., Battle Creek, Mich.
- 1905 Fitzgerald. William H., 904 Main St., Hartford, Conn.
- 1904 Gelbach, Rudolph W., 75 10th St., Hoboken, N. J.
- 1896 Godfrey. Charles C., 340 State St., Bridgeport, Conn.
- 1897 Graves. William B., 426 Main St., East Orange, N. J.
- 1914 Greenwald. Isidor, 317 East 57th St., New York, N. Y.
- 1896 Hallock. Frank K., Cromwell, Conn.
- 1911 Harris. Isaac F., Park View, Tuckahoe, N. Y.
- 1897 Harvey, Thomas W., 463 Main St., Orange, N. J.
- 1897 Hedges. B. Van Doren, 1225 Watchung Ave., Plainfield,
N. J.
- 1900 Hedges, Ellis W., 703 Watchung Ave., Plainfield, N. J.
- 1903 Hyde, Fritz Carleton, Putnam Ave., Greenwich, Conn.
- 1894 Ill, Edward J., 1002 Broad St., Newark, N. J.
- 1910 Jackson, Holmes C., 338 East 26th St., New York, N. Y.
- 1923 Krasnow, Frances, 437 West 59th St., New York, N. Y.
- 1896 Leach, Philip, Columbia Trust Co., 358 Fifth Ave., New
York, N. Y.
- 1905 Lee, Frederic S., 437 West 59th St., New York, N. Y.
- 1925 Lewinski-Corwin, E. H., 445 Riverside Drive, New York,
N. Y.
- 1921 Little, Clarence C., University of Maine, Orono, Maine.
- 1894 Lowe, Russell W., Ridgefield, Conn.
- 1904 Lusk, Graham, 580 Park Ave., New York, N. Y.
- 1899 McCoy, John C., 292 Broadway, Paterson, N. J.
- 1900 McLaughlin, George E., 41 Crescent Ave., Jersey City,
N. J.
- 1905 Mandel, John A., 338 East 26th St., New York, N. Y.
- 1899 Marvel, Philip, 1616 Pacific Ave., Atlantic City, N. J.
- 1900 Miles, Henry S., 144 Golden Hill St., Bridgeport, Conn.
- 1904 Miller, George N., 943 Lexington Ave., New York, N. Y.
- 1892 Munger, Carl E., 81 N. Main St., Waterbury, Conn.
- 1923 Myers, Victor C., Univ. of Iowa, Iowa City, Iowa.
- 1904 Nall, Edwin Henry, Briarcliff Manor, N. Y.
- 1902 Neer, William, 243 Broadway, Paterson, N. J.
- 1904 Onuf, B., 208 Montross Ave., Rutherford, N. J.

- 1896 Pierson, Samuel, 61 Broad St., Stamford, Conn.
- 1903 Pratt, John E., Washington Ave., Dumont, N. J.
- 1901 Rector, Joseph M., 681 Bergen Ave., Jersey City, N. J.
- 1894 Root, Edward K., 990 Asylum Ave., Hartford, Conn.
- 1897 Runyon, Mefford, 110 Irvington Ave., South Orange, N. J.
- 1893 Schauffler, William G., 21 Morven Place, Princeton, N. J.
- 1896 Schavoir, Frederick, 40 South St., Stamford, Conn.
- 1918 Seaman, Emily C., 246 West 71st St., New York, N. Y.
- 1920 Sherwin, Carl Paxon, 41 Anderson Ave., Scarsdale, N. Y.
- 1905 Smith, Frank L., So. Egremont, Mass.
- 1902 Smyth, Herbert E., 476 John St., Bridgeport, Conn.
- 1904 Soper, George A., 67 Red Brook Rd., Great Neck, N. Y.
- 1913 Stockard, Charles R., Cornell Med. College, New York.
- 1901 Synnott, Martin J., 63 S. Fullerton Ave., Montclair, N. J.
- 1897 Twinch, Sidney A., 24 Fulton St., Newark, N. J.
- 1902 Van Vranken, Gilbert, 1881 N. Raymond Ave., Pasadena, Calif.
- 1905 Von Tiling, Johannes H. M., 278 Mill St., Poughkeepsie, N. Y.
- 1904 Wainright, Jonathan M., Co. Bank Building, Scranton, Pa.
- 1904 Wallace, Henry, 201 Ridgewood Ave., Glen Ridge, N. J.
- 1895 Wilson, Norton L., 410 Westminster Ave., Elizabeth, N. J.
- 1902 Wright, John W., 810 Myrtle Ave., Bridgeport, Conn.

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- Bastianelli, Raffaele. Prof. Clin. Surg., Univ. of Rome, Hon. F.R.C.S. Rome, Italy.
- Bouchard, Charles Jacques, M.D. Prof. Gen. Path. Fac. of Med. Paris, France.
- Celli, Angelo, M.D. Prof. Hygiene, Univ. of Rome, Italy.
- Cheyne, William Watson, M.D. C. M. Edinburgh, F.R.C.S., F.R.S., LL.D., etc. London, England.
- Dumont, Henri, M.D. Havana, Cuba.
- Fournier, Alfred, M.D. Paris, France.
- Keen, William Williams, M.D., LL.D., F.R.C.S., Prof. Surg. Jefferson Med. College. Philadelphia, Pa.

- Kitasato, S., M.D. Director Institute of Infectious Diseases.
Tokio, Japan.
- Marie, Pierre, M.D. Fellow Fac. of Med., Paris, France.
- Matas, Rudolph, M.D., LL.D., F.A.C.S., Prof. Surg. Tulane Univ.
of Louisiana. New Orleans, La.
- Moynihan, Sir Berkeley, C.B., M.S., F.R.C.S., Hon. F.A.C.C.
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- Pavlov, Ivan Petrovic, M.D. Prof. Physiology Univ. of Petro-
grad, Russia.
- Ramon y Cajal, Santiago, M.D. Prof. Histology, Histochem.
and Path. Anat., Univ. of Madrid, Spain.
- Roeser, D.P., M.D. Athens, Greece.
- Roux, Pierre-Paul Emile, M.D. Director Pasteur Institute.
Paris, France.
- Stewart, Ferdinand Campbell, M.D. Florence, Italy.
- Vaughan, Victor Clarence, Ph.D., Sc.D., M.D., LL.D., Dean,
Prof. Hygiene and Physiol. Chem., Med. Dept., Univ. of
Michigan. Ann Arbor, Mich.
- Welch, William Henry, A.B., M.D., LL.D. Prof. Path. Johns
Hopkins Univ. Baltimore, Md.

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*Inslee, S., New York	*Starr, Charles J., New York
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BULLETIN
OF
THE NEW YORK
ACADEMY OF MEDICINE

INSTITUTED 1847
SECOND SERIES, VOL. 1, No. 6

AUGUST, 1925



PUBLISHED MONTHLY BY
THE NEW YORK ACADEMY OF MEDICINE
LANCASTER, PA.
Lime & Green Sts.
NEW YORK
17 W. 43d St.

1925

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Entered as second-class matter, April 6, 1925, at the postoffice at Lancaster, Pa., under the Act of August 24, 1912.

Subscription \$2.00 per year. Single copies, 25 cents.



VALENTINE MOTT

THE NEW YORK ACADEMY OF MEDICINE

VOL. I

AUGUST, 1925

No. 6

VALENTINE MOTT

Prior to the introduction of anæsthesia (1847), modern English and American surgery was mainly occupied with ligations of arteries and excisions of bones and joints. On the Continent, other things were done, particularly in subcutaneous and plastic surgery; but in our own country, the story of these earlier days is centered in the bold performance of difficult, dangerous operations by rugged pioneers, whose powerful arms were as much employed in holding down the writhing, screaming patient as in plying the needle and the scalpel. Our history begins in 1796, when Dr. Wright Post, of New York, for the first time in our country, ligated the femoral artery for aneurism by the Hunterian method, to be followed by his equally successful ligations of the primitive carotid (1813, 1816), the external iliac (1814) and the subclavian (1817). In 1781, Dr. John Warren, of Boston, amputated at the shoulder joint. A few years later, in the backwoods of Kentucky, Dr. Ephraim McDowell performed his first ovariectomy (1809) and Dr. Charles McCreary first excised the clavicle with success (1813). What followed thereafter is a long and complex history of brilliant operating, culminating in the foundation of operative gynecology by a country doctor in South Carolina, Marion Sims. Of this group of pioneer surgeons, the most remarkable was unquestionably Dr. Valentine Mott, whose skill in operating was derived from two great teachers, Wright Post and Astley Cooper. Mott performed no less than 138 ligations of the great vessels for aneurism, 165 lithotomies and over 1,000 amputations. What is more to the purpose, his

patients usually recovered and lived. In 1818, to save the life of a sailor then under operation for subclavian aneurism, Mott ligated the innominate artery, two inches from the heart, with survival of his patient for 28 days. Thereafter, he tied the femoral 57 times, the primitive carotid 51 times, the popliteal 10 times, the subclavian 8 times, the external iliac 6 times, the carotid and internal iliac twice each, and the common iliac once. On June 17, 1828, he excised the clavicle for osteosarcoma with tough adhesions, a bloody four-hour operation, requiring 40 ligations of arteries, yet with complete recovery of his patient. In 1821 he performed the first operation for osteosarcoma of the lower jaw, was the first to excise it for necrosis, and in 1832, introduced his operation for immobilizing it. He successfully amputated at the hip-joint in 1824 and removed a large fibroid tumor from the nasopharynx in 1841. This is a brilliant record indeed, particularly in getting surgical patients well, without anæsthesia or antisepsis. It placed Mott on a level with the greatest European surgeons of his time, who received him with a respect and consideration rarely accorded Americans in those days. Mott's teacher, Sir Astley Cooper, said: "He has performed more of the great operations than any man living, or that ever did live."

Valentine Mott, son of Dr. Henry Mott, a physician of English descent, was born at Glen Cove, near Oyster Bay, Long Island, on August 20, 1785. He got his schooling by private tuition at Newton, Long Island, and was a good Greek and Latin scholar all his life. In 1804, he began to study medicine under Dr. Valentine Seaman, of New York, and in 1807 took his M.D. at Columbia College with a graduating dissertation on the therapeutic properties of the marsh rosemary (*Statice limonium*). After the usual years of study at London and Edinburgh, where he came under Astley Cooper, Monro, Home, Hope and Dugald Stewart, he became, at the age of 26, professor of surgery in Columbia College (1811), occupying the chair until 1826, when the whole faculty resigned to form the Rutgers Medical College, of New Jersey. In 1831, when the Rutgers College closed, Mott was appointed professor of operative surgery in the College of

Physicians and Surgeons. The hazards of the kind of bold surgery he was then doing broke down his health in 1834 and he spent the next six years in travel through Europe and Asia. He was a good traveler, putting up with hardship with cheerfulness and equanimity, and probably saw more of real conditions in Greece, Asia Minor and Egypt than any other American of his time. After considerable exposure to bubonic plague in the near East, and having made fast friendships with all his surgical peers, he returned in 1841, to accept the chair of surgery in Medical College of the University of New York, which he held until 1850, when he went abroad again. Upon his return, he became professor of operative surgery in the College of Physicians and Surgeons, continuing later, as emeritus professor in this chair, until his death on April 26, 1865. Two of his sons, Valentine and Alexander Brown Mott, were physicians, of whom the former served as a surgeon in the Sicilian rebellion and died of yellow fever in California in 1854. The latter was one of the founders of Bellevue Medical College. Dr. Mott's widow converted his library and museum of pathological specimens into a memorial at 64 Madison Avenue in 1866. The collection was transferred to the Academy of Medicine in 1909.

Dr. Mott was a fine figure of a man, with an open winning countenance in youth, an urbane, attractive gentleman whose later portraits resemble those of well-born Englishmen of the period. He was a good, careful teacher, popular with the students, whom he advised never to attempt a dangerous operation without first considering whether they would care to undergo it themselves. In his travels, he notes with aversion the tendency of continental surgeons toward showy operating with a callous disregard for the patient's recovery. He was not that kind of a man. We should not recount his surgical triumphs to-day, were it not for his wonderful record of recoveries due to constant solicitude for his patients. His wit in the surgical clinic was of the period. On one occasion, when he was consulting with the mother of a dirty, emaciated child, a half-bred student jumped the rail of the amphitheatre and began to examine the naked infant himself. Wheeling about suddenly, Mott said: "Are you

the father of this child?" Amid the derision of his fellows, the blushing student made an ignominious retreat to the back benches.

Gross, in his eulogy of Mott, notes only one fault: "As a lecturer, he is said to have occasionally been too egotistical." And thereby hangs a tale. The pioneer period before the Civil War was one in which the possibilities of developing the boundless resources of our country filled every mind, an uncritical, sanguine, spread-eagle period to which Arthur Hugh Clough reacted with the express conviction: "Emerson is the only profound man in this country." Emerson himself said, in his lectures: "The American eagle is well, but beware of the American peacock." In his letters to Carlyle, he says that the trouble with Americans of the period is "not water on the brain, but a little gas there." "Yankee Doodle, our then popular national air, affected the Austrian poet Lenau as "a stiff bear dance," in other words, a good quickstep for troops hiking to war, but droll for state occasions. To Henry James, the sculptures and paintings in the rotunda of the Capitol were "touching reminders of the early period of American art." Upon this queer period of wind-bag oratory, Mott fell with a single obsession: priority in surgical procedure. His was nowise an unfinished mind, but this subject affected him as with the anatomist Pieter Camper, who, in investigating the osteology of whales, began to see even pretty girls as modified whales. Mott's case-reports are clear, precise, unaffected and simple, but his travels are full of ludicrous self-adulation about his operations, to which he constantly recurs. Yet he was timorous about writing a surgical text book. He was wise. His best work is recorded in his additions to his huge translation of Velpeau's *Surgery* (1847), which is now our great source-book for the history of surgical operations.

We read that Mott's *Travels in Europe* (1842) exposed him to "severe and ungenerous criticism from the medical press." I have waded through this stodgy volume of 425 pages, and my reaction to it is that of Falstaff: an intolerable deal of verbiage to a half-pennyworth of facts. The positive facts I glean from the tedious perusal are that dolphins were sacrificed to Ceres at

Phalerus, that a true Greek girl never dances except with her own sex, that modern Greeks sing with a nasal twang, that medical students in Rome went about the clinics with jars of live coals to keep them warm, that Egyptians, like the Spaniards, keep their houses cool by shutting out the hot air and light, that fat men are rare in Egypt, that Mohammed Ali had women trained in midwifery for exclusive harem practice, and that a Turk made lime out of the marble pavement of the Theseion in 1769. Jestings apart, for a "big, strong, healthy man," Mott writes in this book in what Lady Dufferin called the Honorable Impulsia Gushington manner, the Laura Matilda vein affected by young ladies of the keepsake period, who half-memorized Burke's Peerage and Roger's "Italy." The volume is padded throughout with that gratuitous parade of classical lore which disfigured even the prose of Poe. The longest chapter, that on Greece, is stuffed with guide-book information, trite mythology and triter citations from Childe Harold. When Mott tells how the unscrupulous Dupuytren got hold of his paper on excision of the jaw and then tried to shoulder him out of his priority, he does it with the fussy italics of maiden ladies in Victorian novels. The sound and readable parts of the book are his fine and generous pictures of his great surgical colleagues abroad, his accounts of goitre, pellagra, the marsh-fevers of Greece and Italy, his reasons for interdicting the Italian climate for consumptives, his view that, in antiquity, leprosy and lues were probably identical, his generous speculations on the futility of quarantine in malarial fever and of disinfection against bubonic plague. His vision was keen enough, his literary style eminently genteel, but it takes him a page to tell us that Hell-Gate is a fiercer current than that between Scilla and Charybdis, the centric fact being buried in a cocoon of verbiage. He is humorous only about the smell of vagrant Greeks, the large-sized bed-bugs on the plains of Marathon and the obesity of women in Asia Minor. He damns the ambitious Venetians and Lord Elgin for despoiling the Parthenon in most elegant language and his references to nudity are invariably stilted. Of the Venus dé'Medici, he complains that "it is too diminutive, while Canova's Venus is better be-

cause there is more of it." Pauline Borghese (Napoleon's sister), who posed for the statue, would have smiled at this tribute. The Theseion at Athens is too small for him and only the Pyramids come up to his expectations. In Florence, however, he notices a misplaced inguinal artery in a wax preparation, and goes straight to the correct inference, viz., that since the time when the great Quattrocento painters practised dissection, anatomical teaching at Florence seems to have been concentrated mainly on the muscles. The most interesting thing in Mott's book is his account of the petrified pathological preparations of the Florentine Sigato. This Signor Sigato, it seems, had acquired in the far East a secret process of petrifying animal substances, so that pathological preparations, thus hardened, could be sawed into slabs, susceptible of a high polish, preserving at the same time the most delicate details of structure and color, even to the bloodvessels. Mott describes a table-top, a mosaic of squares, showing perfect cross-sections of a phthisical lung, hydatids of the liver, renal calculus and cardiac lesions. The petrified solid specimens could be thrown about in the roughest way without damage. Mott tried to employ Sigato, who was heavily in debt, but the unfortunate Florentine died three weeks later and his wonderful secret died with him. If it could be rediscovered, what wonderful archives in polished stone would be conveyed to posterity by pathologists and cross-section anatomists!

F. H. GARRISON

THE APPLICATION OF NEWER METHODS IN BLOOD-CHEMISTRY TO CLINICAL MEDICINE

RENEE VON E.-WIENER

(Delivered before the New York Academy of Medicine, May 21st, 1925.)

The blood together with the lymph provides a vehicle for the chemical correlation of the cells of the body. Any changed condition in the tissue fluids will be promptly reflected in its composition and conversely any change in the basic constituents of

the blood will affect the composition of the tissue fluid and hence of the tissue juice within the cells. Disturbances in the function of the organs of elimination as well as abnormalities in the intermediary metabolism of the body will affect the composition of the blood.

The composition of the blood is also materially affected by the ingestion of food and the intensity of the catabolic processes. While the concentration of certain basic components such as water, inorganic salts and proteins is affected to only a slight extent, the concentration of food substances being conveyed to the tissues as well as the concentration of waste material varies within wider limits and for a greater period of time. It follows that for very exact work a diet of standard chemical composition for a few days preceding the blood test is necessary, for clinical work it suffices to obtain the sample from the subject in a morning fasting condition. For a determination of the basic constituents which are only transitorily affected by food ingestion a three hour interval between food intake and securing of blood sample is sufficient. About 80 per cent. of the blood is water. Various gases, inorganic salts and organic compounds are held in true solution. The more complex organic compounds, such as proteins, higher carbohydrates, lipoids, etc., are held in colloidal solution, while fats, especially shortly after absorption, are present in finely emulsified form. Structurally the blood is a suspension of cellular elements in this heterogenous solution, the plasma. The components of the blood, most of which are present in minute concentrations, are unequally distributed between the corpuscles and the plasma. Certain organic as well as inorganic components do not penetrate the erythrocytes or if so only in extremely small proportion. Fatty acids and lipoids as well as the plasma proteins are also adsorbed to a certain extent on the surface of the erythrocytes. It is best to employ plasma rather than whole blood for the quantitative determination of its constituents, except for those components which are present in nearly equal or even greater concentration in the corpuscles than in the plasma. Many of the blood constituents of clinical importance are present in minute concentrations and the need of pre-

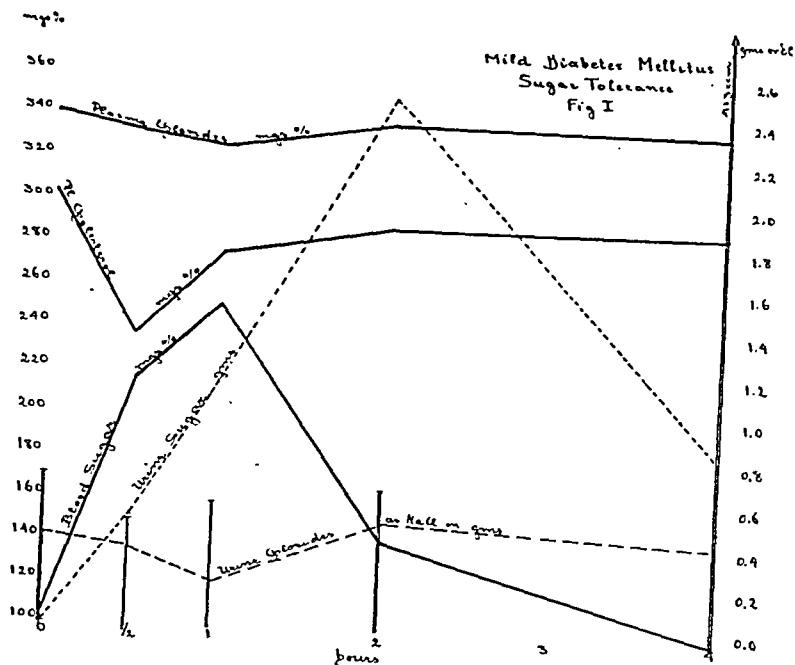
cautionary measures to avoid contamination by foreign substances must be realized. When the blood is obtained from the subject not in a morning fasting condition but after a three hour fast the time when the last meal had been completed and the amount of food taken expressed in gms of carbohydrate, protein and fat should be noted. To insure that the Luer syringe as well as the needle employed are chemically clean and sterile, the syringe must be washed with tap water, followed by two rinsings with distilled water and dried over night at a temperature of 110° Cent. The needles may be dried with alcohol and ether. Sterilization by boiling in tap water does not insure a chemically clean apparatus and causes errors not only in the calcium determination but also in other analyses of the blood. Before delivering the drawn blood into a chemically clean and sterile glass flask, containing a measured amount of anticoagulant, the needle should be detached to avoid damage to the blood corpuscles.

The use of Sodium citrate as anticoagulant does not interfere with the determination of plasma Calcium, nor does it render the determination of plasma Fibrinogen more difficult, as is the case when oxalate is used. The employment of Sodium citrate as anticoagulant is entirely satisfactory only if it has been recrystallized, finely ground in a steel or agate mortar, and introduced into the flask in a dry state. Introduction of the citrate in solution and allowing it to dry causes the formation of larger crystals which dissolve too slowly when the blood is added. The minimum amount of Sodium citrate which will prevent coagulation is 4 mgs per ccm of blood, the maximum amount which may be used without danger of causing hemolysis or affecting certain determinations is 10 mgs per ccm of blood. For clinical work it is best to keep within the limits of 4 to 8 mgs per ccm of blood. For research work a constant proportion must be maintained.

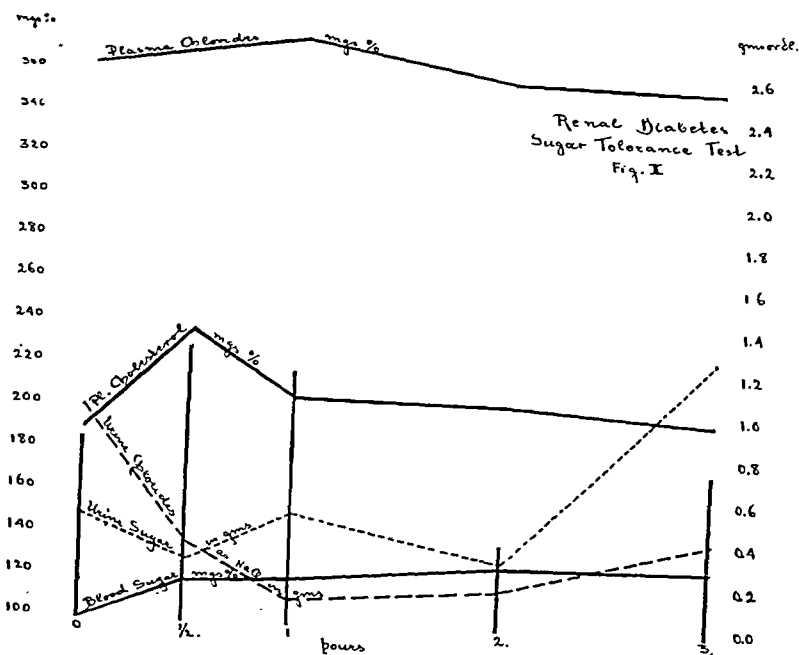
While determinations of a single component are often of clinical value in following a case, a more complete picture is obtained by a coincident analysis for the concentration of other elements, and the diagnostic value of the quantitative analysis may thereby be enhanced.

Such analyses have been made for a number of years and the determinations shown in the following tables were chosen as rep-

Mild Diabetes Mellitus
Sugar Tolerance
Fig I



Renal Diabetes
Sugar Tolerance Test
Fig. I



representative from a great number of cases. Table I gives the determinations of the Blood Sugar, Plasma Calcium, Chlorides and Cholesterol and the Serum Proteins in Glucosuria, *i.e.*, uncomplicated Diabetes Mellitus, Diabetes Mellitus with complications and the so-called Renal Diabetes. On the first line of the table the limits of normal concentrations are shown. It is interesting to observe that while the Plasma Calcium in uncomplicated Diabetes Mellitus is at the high normal level, if not actually increased, in the cases complicated by Arterio sclerosis and Myocardial insufficiency it is almost always at the low normal level or decreased below the normal concentration. In renal diabetes the Calcium concentration remains within the normal limits. The chlorides in true Diabetes Mellitus are usually decreased below the normal level while in the renal diabetic cases they are increased above the normal limit or at least a high normal. One case of renal diabetes was put on a salt free diet. The chloride concentration became normal and the calcium, which had always been within the normal limits increased slightly above the normal. The concentration of the sugar in the urine decreased from an average of 2 per cent. with a blood sugar of 100 mgs per cent. to an average of 0.8 per cent. with the same blood sugar concentration. The volume output remained the same and the decrease in percentage cannot be ascribed to greater dilution. The concentrations of the Serum Proteins are high in Diabetes Mellitus and in Renal diabetes, especially the Albumen fraction. Coincident with the decrease in the Calcium concentration in the complications mentioned the Albumen fraction is also found decreased. The Cholesterol in true diabetes is usually increased in Renal Diabetes it is normal.

The changes in the concentrations of Blood Sugar, Chlorides and Cholesterol as well as the excretion of Sugar and Chlorides in the Urine have been followed during Sugar Tolerance tests on true diabetics and renal diabetics. Figure I shows the typical curves of mild diabetes mellitus, figure II those of renal diabetes. The curves have been selected as characteristic from a total of twenty cases.

Aside from the characteristic and well known difference in the blood sugar curve, there is also a difference in the cholesterol and

in the chloride curve. In cases of diabetes mellitus there is usually a slight drop in the chlorides and a drop in the cholesterol 30 minutes after glucose ingestion. The true renal diabetic at 30 minutes post glucose ingestion shows a decided rise in cholesterol and a slight rise in the plasma chlorides, resembling the normal but in a more accentuated form. The curves of sugar excretion of these types also varies. In true diabetes mellitus the curve reaches its peak shortly after the blood sugar curve has passed its peak and at the fourth hour the excretion is materially decreased. In renal diabetes the peak of the sugar excretion is not likely to be reached or passed within the period of the experiment. The chloride excretion curves do not differ materially. The volume output also differs. It is delayed in diabetes mellitus while in renal diabetes the fluid taken is excreted to a great extent in the early period of the experiment. The vertical lines in Figs. I and II indicate the volume output. There was no change observable in the concentration of Calcium or Serum proteins other than that accounted for by a very slight change in cell volume. This observed change of fluid to cell mass in the blood was however not sufficiently great to account for the changes in the chloride and cholesterol concentration.

The cases of impaired kidney function (Table II) may be divided into two main groups: the azotaemic type and the hydraemic type.

In the azotaemic type the serum proteins are a low normal or slightly decreased. There is no consistent decrease in the calcium concentration nor increase in the chloride concentration. The fibrinogen is slightly increased. Subjective symptoms and clinical examination frequently lead to the presumption of the existence of a focus of infection in the absence of focal symptoms. In such cases the determination of cholesterol and fibrinogen as well as the sedimentation rate is of considerable clinical value especially if interval analyses are made. With azotaemia there is always a reduction in the concentration of the urine uric acid excretion which may be compensated for by an increase in the volume output, without a marked or consistent uricacidemia.

The simultaneous determination of uric acid in the blood and urine as well as the determination of the urine uric acid excreted

during twenty-four hours is of value not only in cases of renal insufficiency but also in uricacidemia without retention of other nitrogenous metabolites. The kidneys in health concentrate uric acid approximately twenty times but concentration as high as sixty times may occur. An excess supply of uric acid of endogenous or exogenous origin may raise the blood uric acid concentration even in the absence of renal insufficiency. Again, with a limited supply of uric acid and an increased volume output its content in the blood may not be raised beyond the high normal level despite a decreased ability of the kidneys to concentrate it. The two factors, production of uric acid in the tissues and possible destruction in the blood or special organs, on the one hand, and excretion by the kidneys, on the other hand, are quite unrelated.

If the blood and urine specimen are obtained from the subject, one hour after the first voiding and in a morning fasting condition, which includes fasting from water, the ratio "mgs per cent. Urine Uric Acid / mgs per cent. Blood Uric Acid" will normally lie between 20 to 35. The ratio "mgs Uric Acid in 24 hrs. / mgs per cent. Blood Uric Acid" on a purine free diet for a healthy individual is 250 to 350. In mild kidney deficiency the single specimen ratio will always be low, while the twenty-four hour ratio, due to an increased volume output may be normal, and the blood uric acid not increased above the high normal level.

The hydraemic type may again be divided into two groups. "A" The chloride content of the blood is materially increased while the serum proteins are not reduced or only very slightly so. "B" The chloride concentration is normal or only slightly increased but the concentration of the Se. proteins, especially the albumen fraction, is very much lowered. The calcium concentration is below normal and the fibrinogen and cholesterol are very much increased. Determinations on this type are shown in table II. In this group of cases there is decided retention of water in the tissues and this is due to a defective osmotic-filter apparatus, that is reduction of serum protein concentration, which may be followed or accompanied by a slight chloride retention. The nitrogenous waste products are not increased, or

only slightly so, the alkali reserve, the pH and the inorganic phosphorus are normal or only very slightly changed. The usual tests for renal function, except water and NaCl elimination, are normal or only slightly subnormal. The cell volume of the blood is usually not reduced. The reduction in the Se. proteins occurs to the largest extent in the albumen fraction and the ratio "Albumen/Globulin" is therefore materially decreased. A ratio below 1 is often encountered; a ratio below 0.5 indicates a severe condition. The fractionational precipitation of the proteins must be carried out immediately after the sample has been obtained. If the blood or plasma is allowed to stand, especially if exposed to sunlight or if an excess of anticoagulant has been used, a change in the solubility of the albumen fraction may occur which causes a reduction in its concentration and an increase in the concentration of the globulin fraction.

The decrease in the calcium conc. runs parallel to the decrease in the albumen conc. The rise in the fibrinogen and cholesterol recalls the increase in these substances observed in chronic infections. Coincidentally the sedimentation rate is very much increased. Improvement in the condition is reflected by a decrease in the sedimentation rate and repeated estimations of the rate in such cases, as in cases of infectious diseases, *e.g.*, T. B., furnishes a guide, other things being equal, of the progress or retrogression of the disease.

Blood chemistry determinations in the toxemias of pregnancy are shown in table III. The average typical concentrations which obtain during the course of a normal pregnancy are shown as well as blood chemistry estimations representative of the four types of Toxemias.

In normal pregnancy there is a steady increase in the cholesterol and fibrinogen conc. progressively during the pregnant term. There is a reduction in the cell vol. and this reduction may account for the slight decrease in plasm Ca. concentration towards the termination of the pregnancy. The chloride concentration in normal pregnancy is increased above the normal during the later months. There is a slight reduction in the Se. proteins but the ratio Alb./Glob. remains normal.

The Toxemias may be divided into four groups: "A" Vomiting of pregnancy, "B" Toxemia with retention, "C" Toxemia with uricacidemia, "D" Eclampsia.

"A." Depending upon the severity of the vomiting the chloride content of the blood may be increased if the loss of fluid is relatively greater than the loss of HCl from the stomach, or decreased if the reverse is the case, a secondary factor being the degree of chloride storage in the tissues. Slight acidosis is often present. The normal increase in cholesterol in pregnancy is absent and in the severer cases the cholesterol is decreased below the concentration normal for non-pregnant women. Long continued vomiting (pernicious) may result in an accumulation of nitrogenous waste products in the blood.

"B." In this group there is definite retention of non-protein nitrogen, urea, uric acid and occasionally creatinine. The fibrinogen shows the usual increase during pregnancy, it may be slightly accentuated. The increase in cholesterol is normal. The uric acid ratio is of the retention type. That is to say, the blood uric acid may be increased or merely high normal with a lowering of the per cent. excretion of the uric acid in the urine.

"C." This type of cases have definite uricacidemia but no other nitrogen retention. The fibrinogen is increased above the rise in concentration usually present during pregnancy. The cholesterol may be far above the normal pregnancy cholesterol level. The icterus index may be increased above the index normal to pregnancy and the Van der Bergh test for bile acids may show the presence of bilirubin in a concentration greater than 0.5 mgs per cent. The urine uric acid to blood uric acid ratios show that the kidney potential for concentration of uric acid is either not at all or only slightly impaired and that the high blood uric acid is not due to a decrease in the excretion of uric acid by the kidneys below the normal concentration.

"D." In eclampsia there may be a moderate azotaemia but the uric acid is the only nitrogenous metabolite that is ever excessively increased. The calcium concentration is decreased, the chloride concentration is usually low but sometimes normal. The cholesterol may be increased or be normal for the period of

gestation. If the concentration of the calcium and the chlorides are expressed in millimols the product of the calcium concentration and the square of the chloride concentration is a constant within narrow limits in health as well as in many pathological conditions. This constant is reduced in acidosis, diabetic coma, uremia and eclampsia; in fact in all conditions involving a change in the reaction of the blood. The degree to which this constant varies from the normal seems to indicate the degree of acidosis present.

The determination of fibrinogen and of cholesterol as well as the sedimentation rate is of value in cases of proven or of suspected infection in which there are no definite or general focal symptoms. In acute infections the fibrinogen is high and the cholesterol at first is low. The defensive mechanism of the body seems to involve a rise in the cholesterol concentration and in chronic infections which are being actively combatted by the body the cholesterol is always increased above the normal. In certain infections, *e.g.*, tuberculosis, the calcium concentration is decreased below the normal. In furunculosis there is usually a definite decrease in the cholesterol concentration.

In diseases of the skin the estimation of the uric acid, sugar, calcium and cholesterol may be of clinical assistance. In urticaria, angio-neurotic edema and dermatitis the calcium is usually decreased below the normal, in acne its concentration remains at the high normal level.

In gout the blood uric acid is more or less increased, but its deviation from the normal level is not as marked as is the decrease in the urinary concentration of uric acid, especially just preceding an acute attack. The fibrinogen is considerably increased. The calcium is usually slightly decreased but increases above the normal just preceding an acute attack have been found.

The sedimentation rate is increased in many pathological conditions, and by itself is therefor not of much diagnostic value. The fibrinogen is not the only substance which by its increased concentration causes an accelerated rate. The globulin frac-

tion, cell volume, viscosity and the pH as well as a certain unknown factor which causes a decrease in the sedimentation rate also play a part in determining the rate at which agglutination and sedimentation take place. Many instances of "reduced sedimentation rates" with normal cell volumes, normal protein concentrations and even increased fibrinogen have been encountered. In most of these cases indicanuria was present and the feces examination in some was said to show a high histamine content. It is possible that the unknown factor which decreases the rate of sedimentation may prove to be the presence of an increased amount of an anti-agglutinating substance in the blood. Such chemical bodies are found among the products of protein putrefaction and at least one, histamine, is known to lower the coagulability of the blood.

The cell volume estimation is a valuable aid in the proper interpretation of the blood chemistry figures; in fact in certain cases determination of the water content may also prove advisable. In the methods that are commonly used for the estimation of substances in the protein free filtrate the volume occupied by the precipitate is not taken into account and the filtrate is considered as though occupying the volume of the original precipitation mixture. This introduces an error which may be disregarded as long as the variations in cell volume remain within the normal limits, since the values are comparable. If the cell volume and hence the precipitate are much reduced the error inherent to this method is also reduced and conversely if the cell volume is increased the error is increased. Ten ccm. of the filtrate obtained by the Folin and Wu precipitation method from a blood with a cell volume of 50 per cent. will contain the soluble substances present in about 1.67 ccm. of blood and not 1 ccm. as is assumed in the calculation. Conversely if the cell volume is much reduced, let us say to 22 per cent., ten ccm. of such a filtrate will contain the soluble substances present in approximately 1.25 ccm. of blood. The smaller the so-called dry volume, *i.e.*, the precipitate, the closer the approach to the theoretical value. Adsorption of the soluble substances on the protein pre-

cipitate is indeterminate but in any case could never compensate for the above mentioned source of error. The variations in the cell volume usually encountered are not sufficiently large to affect the comparative values; but the influence of a reduced cell volume and hydraemia on the final results of the analyses should be taken into account. Thus the often mentioned low urea and sugar concentration in pregnancy may be attributed in part at least to this effect.

The determination of viscosity and surface tension are physico-chemical measurements which may prove of value.

Ionic antagonism is a phenomenon of great importance in life processes and the determination of the other cations present, aside of calcium, should be undertaken. The concentration of resorbed intestinal toxins as well as the enzymatic activities taking place in the blood stream, are subjects which also may prove worthy of future investigation.

Supplemented by Urine chemistry, by the chemistry of the Respiration and by Metabolic Rate estimation, blood chemistry offers the best means of investigating the status of the chemical equilibrium of a living organism and chemically correct and critically interpreted blood analyses will be found to have a wide and valuable clinical application.

TABLE I
BLOOD CHEMISTRY IN GLUCOSURIA

	Bl.		Cell vol. %	Ca. mgs. %	PLASMA		Fib. mgs. %	SERUM		Tot. Ratio Protein Alb. %	Urine Sugar at time of blood	
	Sugar mgs. %	%			Cl. mgs. %	Chol. mgs. %		Alb. %	Glob. Protein %			
Low Normal	80	42.0		9.8	355	150	250	4.8	1.8	6.6	2.8	-----
High Normal	100	48.0		10.3	365	165	325	5.5	2.0	8.1	1.8	-----
<i>Diabetes Mellitus</i>												
No. 2608	384	55.3		10.4	350	250	400	5.30	2.98	8.28	1.8	xxxx
No. 2361	125	37.5		10.6	343	240	-----	5.64	1.58	7.22	3.5	0
No. 2144	333	43.6		10.1	331	220	340	4.71	1.83	6.54	2.6	0.8%
" "	138	46.0		10.4	335	210	-----	4.78	1.73	6.51	2.8	0
No. 1675	268	35.0		10.2	344	-----	455	4.69	2.37	7.06	2.0	xxxx
" "	200	35.1		10.1	327	344	-----	4.56	2.12	6.68	2.1	0
" "	510	36.1		9.6	318	345	383	4.08	2.75	6.83	1.5	4.0%
No. 2291	182	37.7		9.7	350	228	455	5.22	2.45	7.67	2.1	tr.
No. 2529	196	35.0		8.8	318	269	278	3.40	1.83	5.23	1.9	x
No. 2006	174	31.8		9.4	350	-----	-----	-----	-----	-----	-----	tr.
No. 2348	210	40.0		9.5	346	232	555	3.80	1.40	5.20	2.7	x
No. 2534	222	39.5		11.1	340	166	590	4.70	2.37	7.07	2.0	xxx
No. 2566	174	45.0		10.6	350	-----	-----	4.15	1.40	5.55	2.9	0
Marg.	149	45.3		10.7	360	180	288	4.35	2.60	6.95	1.7	0
<i>Renal</i>												
No. 2595	80	48.5		10.3	361	156	278	5.93	1.58	7.51	3.8	0.95%
No. 2312	103	43.2		10.3	365	228	346	5.50	1.94	7.44	2.8	2.00%
" "	108	41.5		11.5	350	160	-----	6.00	2.04	8.04	2.9	0.80%
" "	100	40.7		10.0	383	-----	-----	5.50	1.84	7.34	3.0	2.00%
No. 2584	133	46.5		10.7	372	155	-----	5.80	1.60	7.40	3.6	0.70%
No. 2269	87	42.5		9.8	360	150	245	5.00	2.18	7.18	2.3	x
CO ₂ 25.5 vol. %												
Art. seler.												
Myocard. Art. sel.												
Myocard. Art. sel.												
Myocard. Ins. T. B.												
Gangrene												
Albuminuria												
Retinal Hem.												
SALT FREE DIET												
DIET DISCONTINUED												

CO₂ 25.5 vol. %
Art. scler.
Myocard. Art. scl.
Myocard. Art. scl.
Myocard. Ins. T. B.
Gangrene
Albuminuria
Retinal Hem.

SALT FREE DIET
DIET DISCONTINUED

TABLE II
BLOOD CHEMISTRY IN IMPAIRED KIDNEY FUNCTION

	Cell vol. %	N.P.N. mgs. %	BLOOD		PLASMA				SERUM			Total Ratio Prot. Alb./Glob.
			Uric Acid mgs. %	Creat. mgs. %	Ca. mgs. %	Cl. mgs. %	Chol. mgs. %	Fibr. mgs. %	Alb. %	Glob. %	Total %	
Low Normal	42.0	25.0	1.5	1.3	9.8	355	150	250	4.80	1.80	6.60	2.8
High Normal	48.0	35.0	2.5	1.7	10.3	365	165	325	5.50	2.00	8.10	1.8
Acetemic												
No. 06176	31.5	43.7	2.8	...	8.7	367	...	578	2.78	1.92	4.70	1.5
Dol.	41.0	45.2	4.6	1.8	9.7	365	200	238	3.07	2.49	5.56	1.2
No. 7298	34.7	47.0	3.6	3.0	9.0	373	357	532	4.20	2.20	6.40	1.9
Stan.	36.0	53.0	4.8	2.4	10.2	365	175	465	3.17	3.03	6.20	1.0
Orl.	30.0	80.0	5.0	5.4	...	...	...	530	4.08	2.45	6.53	1.6
No. 2563	21.0	123.0	5.7	4.3	10.2	386	225	447	5.08	3.52	8.60	1.4
No. 73816	27.0	158.0	5.4	4.9	11.1	361	139	500	...	...	...	...
Hydræmic												
No. 2616	42.0	35.5	1.5	...	8.1	413	417	520	1.87	2.04	3.91	0.9
Fol.	25.8	...	...	...	8.3	360	251	655	1.58	4.37	5.92	0.4
No. 2420	26.7	...	...	2.0	10.0	...	150	853	3.36	4.20	7.56	0.8
No. 2465	33.0	34.8	2.5	...	8.7	360	425	1000	1.46	1.34	2.80	1.1
"	44.0	...	...	...	9.2	...	400	770	2.31	1.33	3.56	1.8
"	44.0	38.0	3.6	...	8.9	381	491	590	2.07	1.05	3.12	2.0
"	40.1	41.5	2.0	...	7.6	380	278	650	2.18	2.12	4.30	1.0

Albuminuria

TABLE III
BLOOD CHEMISTRY IN PREGNANCY

	BLOOD				PLASMA			SERUM			Total Prot. Alb./Glob. %	Ratio	
	Cell vol. %	N.P.N. mg%. %	Uric Acid mg%. %	Creat. mg%. %	Sug. mg%. %	Ca. mg%. %	Chol. mg%. %	Fibr. mg%. %	Alb. %	Glob. %			
Normal Pregnancy													
3½ ms.	33.3	.....	.....	.....	.....	10.2	358	168	334	5.33	1.84	7.17	2.9
4 ms.	35.4	.....	.....	.....	.....	10.2	368	278	407	5.04	1.52	6.56	3.3
5 ms.	36.0	.....	.....	.....	.....	10.3	377	168	665	4.58	1.81	6.39	2.5
6 ms.	36.0	.....	.....	.....	.....	10.2	365	232	339	4.87	2.27	7.14	2.2
7 ms.	32.0	.....	.....	.....	.....	10.2	380	214	455	4.64	1.93	6.57	2.4
8 ms.	34.0	.....	.....	.....	.....	9.8	374	266	555	4.90	2.25	7.15	2.2
term	30.0	.....	.....	.....	.....	9.9	366	290	560	4.31	1.84	6.15	2.3
Vomiting													
Mu. 4 ms.	38.0	27.0	1.2	.....	.....	11.1	350	120	350	.....	.....	.....	.....
McG. 5 ms.	29.0	40.0	5.9	.....	.....	9.4	343	133	428	.....	.....	.....	.....
Ka. 5 ms.	15.4	22.2	4.1	.....	80	8.2	382	91	312	4.01	1.75	5.76	2.3
" 6 ms.	21.3	27.2	4.0	.....	.....	8.4	383	104	416	4.04	2.04	6.08	2.0
Atotemic													
Bla. 3 ms.	22.0	94.0	3.8	3.9	91	10.5	394	200	453	4.76	2.29	7.05	2.1
Con. 5 ms.	33.0	44.5	7.2	.....	.....	8.8	360	.....	612	4.32	1.67	5.99	2.5
" 6 ms.	37.7	55.0	7.3	.....	.....	9.4	.....	317	553	3.80	1.77	5.57	2.1
" 7 ms.	29.6	40.0	8.3	1.5	.....	8.6	.....	268	454	3.56	1.77	5.33	2.0
K. J. 9 ms.	30.0	53.5	5.9	1.4	.....	8.8	335	198	702	2.75	2.90	5.65	0.9
Pl. CO ₂ 40.0%													
Pl. CO ₂ 40.0%													
Pl. CO ₂ 45.0%													

Pl. CO₂ 40.0%
Pl. CO₂ 40.0%
Pl. CO₂ 45.0%

TABLE III—(Continued)

	BLOOD				PLASMA				SERUM			Ratio Prot. Alb./Glob.	
	Cell vol. %	N.P.N. mgs.%	Uric Acid mgs.%	Creat. mgs.%	Sug. mgs.%	Ca. mgs.%	Cl. mgs.%	Chol. mgs.%	Fibr. mgs.%	Alb. %	Glob. %		Total %
<i>Uricacidemic</i>													
Ros. 6 ms.	33.6	29.6	6.7	.....	.....	9.9	363	330	650				
H.N. 5 ms.	33.5	20.0	6.9	1.3	.....	8.7	360	210	382				
Orl. 4 ms.	48.0	34.8	4.7	.....	.....	10.0	.....	433	440	3.15	1.28	4.43	2.1
Hai. 7 ms.	43.5	32.2	3.8	.....	.....	.....	.....	351	753				
Pet. 5 ms.	33.3	41.0	11.4	.....	.....	8.2	322	185	905	3.43	4.57	8.00	0.8
													Bilirub. 2.5 mgs %
<i>Eclampsia</i>													
Wal. 9 ms.	29.0	34.6	5.5	.....	.....	8.8	370		553				
Bat. 8 ms.	33.0	37.0	7.7	1.2	.....	9.3	362	210	519				
Rya. 8 ms.	34.0	32.4	8.7	.....	.....	8.8	346	260	343				
Mo. 9 ms.	41.0	44.8	5.8	1.2	.....	9.2	318	368	420				
Ag. post.	26.0	93.3	9.1	3.9	.....	9.3	319	204	705				
" "	33.0	32.7	3.5	1.5	.....	11.0	355		430				
													Post part. One week later

THE USE OF IODIN IN THE TREATMENT OF DISEASES OF THE THYROID GLAND

HENRY ELSNER MARKS

(Summarized from the paper delivered before the New York
Academy of Medicine May 21, 1925)

The empirical use of iodine in the treatment of goiter is of remote origin. In 1895 Baumann announced the discovery of iodine as a normal constituent of the thyroid gland and since that time innumerable attempts have been made to relate the various forms of thyroid disease to disturbances in iodine metabolism and to apply iodine, or iodine-containing desiccated normal glands, to the treatment of these disorders. Frequently, in hyperthyroidism, an exacerbation of symptoms followed such attempts and as a result clinical literature abounds with warnings against the use of iodine in exophthalmic goiter. Kocher taught that iodine must never be given and Mellanby states that in the discussion on the treatment of exophthalmic goiter at the Royal Society of Medicine in 1923 no speaker mentioned the use of iodine or any iodine preparation.

In 1909 Marine published his studies on the anatomy and physiology of the thyroid, showing the relation between iodine content, hyperplasia and colloid formation. He found that when the iodine content of the gland drops below .1% hyperplasia begins, and that when iodine is supplied regressive changes occur, the hyperplastic tissue reverting to colloid-filled vesicular tissue of the normal form. From this he concluded that a colloid goiter is a gland which was once hyperplastic but which has reverted to the resting stage without complete reversion to normal in size. In calling attention to the effect of iodine upon hyperplasia, he warned against the use of large doses, and showed that minute amounts of iodine are sufficient to bring about regression. The isolation by Kendall of the physiologically active iodine-bearing secretion of the thyroid gland in 1916 furnished the basis for further important studies of the quantitative relationship of iodine to thyroid activity. Such studies were made possible by

the use of the basal metabolic rate as a quantitative measure of thyroid activity, as initiated by DuBois. As a result of these studies Plummer has lately again called attention to the use of iodine in thyroid disease. He restricts its use to the pre-operative treatment of exophthalmic goiter and the treatment of post-operative reactions. He distinguishes between exophthalmic goiter with diffuse hyperplasia, in which he believes the thyroid product to be an abnormal thyroxine, and the circumscribed enlargements or adenomatous goiters which, when toxic, he believes elaborate an excessive amount of normal thyroxine. He also states that simple adenoma may become hyperactive when treated with iodine. His reason for using iodine only as preliminary to operation in exophthalmic goiter is that the control of symptoms by iodine cannot usually be maintained for more than a few weeks.

In studying the effect of iodine on patients with thyroid disease at the Vanderbilt Clinic, we determined to treat a series of cases with this agent for as long a period of time as it was possible to keep symptoms under control, and resort to surgery only if iodine and X-ray failed. Some of these patients were treated with iodine alone, others with both iodine and X-ray. In no case was it possible to secure complete relief from physical and mental stress. A few of the patients stopped working during the period when their symptoms were most pronounced, but aside from this they went about their usual activities.

Case 1. A woman admitted in August, 1922, age 64, with diabetes. Complained of weakness and nervousness. The thyroid showed circumscribed enlargement. No eye signs, no tremor. The heart was enlarged, B.P. 169/88, P.R. 132. Only the diabetes was treated at first. In February, March, April, May and September, 1924, and March, 1925, X-ray treatments were given. Lugol's solution was also given during parts of this time. Despite these measures the pulse rate has continued to range between 112 and 160 and the BMR from plus 20% to plus 48%. Subjective condition however is very much improved. Pulse rate still 140 but she looks healthy and well, and says she feels "all right." Operation recommended, but refused.

This is the only case in which we have as yet felt it necessary to recommend surgery, and here only because of the persistent

tachycardia. There are no other signs of thyroid intoxication, there is scarcely any enlargement of the gland, and there is considerable doubt as to whether the tachycardia is due to present hyperthyroidism.

Case 2. Man aged 33, with fairly typical exophthalmic goiter of three years duration. Nervousness, tremor and exophthalmos, with excessive perspiration. Pathological eye signs all present. P.R. 100. BMR plus 35%, with basal pulse rate during the test 108. The thyroid is soft and vascular, with moderate diffuse enlargement. There is little discrepancy between the usual pulse rate and the basal rate. After one week on Lugol's solution, ten drops daily, the P.R. dropped from 98 to 80, he felt stronger, less nervous, and had less palpitation, and the thyroid decreased a little in size. The iodine was now increased to 25 drops daily, and the patient's weight increased ten pounds in a month. With this increase in weight the pulse rate rose again and a ten days interruption of the iodine sent it up still further to 110. A series of four X-ray treatments over a period of ten weeks was now given, combined with resumption of iodine, with the result that the pulse rate dropped to 60, the thyroid became much smaller, the BMR fell to minus 15%, the weight rose again almost fifteen pounds, and the patient resumed work with practically no symptoms. For the past five months there has been no treatment. The weight has dropped again, but the P.R. is now 72, the BMR plus 10%, and the thyroid is just palpable. Exophthalmos is slight. If there are any future recurrences it will be interesting to see whether they can be as easily controlled.

Case 3. Man aged 35 whose illness began eleven weeks before admission with lachrymation, protrusion of the eyeballs and enlargement of the neck. Two weeks before admission shortness of breath and a feeling of obstruction in the throat. He had lost about fourteen pounds in a year. There was a very large soft vascular goiter without nodules, marked exophthalmos, tremor and nervousness. The P.R., however, was only 58 and the BMR was 14% below normal. BPR (Basal Pulse rate) was 54. The body was apparently withdrawing thyroxin from the gland and destroying it faster than it could be replaced. No treatment was given. Two weeks later the picture had changed. The BMR was now plus 39% and the BPR 92. The thyroid seems now to have been actively producing a substance which was stimulating the metabolic rate. Lugol's was now started in doses of fifteen drops daily, and in three weeks the goiter had diminished markedly in size, the PR was 62, the BMR minus 1%, and the BPR 54. His symptoms had improved greatly. Lugol's was now discontinued. In one week the PR had risen to 66, after a second week without iodine it had gone up to 114, and he complained of substernal and precordial distress. He was put back upon iodine and has not yet returned to the clinic. In this case of acute hyperthyroidism we again see but little discrepancy between the basal pulse rate and the usual pulse rate.

Case 4. A woman of 77 years who has complained of enlargement of the eyes for the past six months. There is no perceptible thyroid enlargement, no sweating and little or no tremor. There is nervousness and insomnia, PR 96, the heart is enormously enlarged, 6 cm. to the right and 14 cm. to the left, B.P. 240/114. The radials are sclerotic, there is retinal sclerosis and evidence of diffuse hyperplastic sclerosis of the smaller vessels as well as decrescent arteriosclerosis. BMR was plus 35%, BPR 88. Lugol's was given at once, thirty minims daily, and within a few weeks the PR was 80, the weight increased four pounds, the BMR dropped to plus 10%, and the patient felt vastly better. At the eleventh week an intercurrent acute respiratory infection sent the PR up to 100 and the BMR up to plus 20%. Iodin was increased for one week, and the BMR again dropped to plus 5% and the BPR to 70.

This case is of interest, not only because of the advanced age of the patient, but because of the obscurity of the clinical picture, the immediate and complete response to iodine, the recurrence of symptoms when an intercurrent acute infection increased the demands of the body upon the thyroid, and the immediate and complete response again to an increase in iodine supply. Here again the discrepancy between BPR and usual PR was slight.

The next case is that of a patient with circumscribed enlargement of the thyroid and marked symptoms of sympathetic instability. Chief among these symptoms is a marked discrepancy between the usual PR and the pulse rate under basal conditions, with at the same time marked instability of the metabolic rate so that determination of the true basal rate is difficult, if not impossible. We have noted this syndrome in a number of patients with circumscribed or so-called adenomatous enlargement of the thyroid, but because of limitations of space only three will be cited here. The pulse rate under basal conditions is normal or only slightly elevated, but there is marked tachycardia under ordinary conditions. Tremor, nervousness, palpitation, sweating and insomnia are frequent, and there are often menstrual disturbances. Eye signs and exophthalmos are absent, or present only in slight degree. That the thyroid is implicated in this syndrome is suggested by the shrinkage of the gland and improvement in symptoms upon administration of iodine, but the marked instability of the PR as contrasted with cases of typical exophthalmic goiter indicates the presence of an added factor.

Case 5. A woman aged 45 with circumscribed enlargement of the thyroid, non-vascular. She is nervous and weak, and there are tremor, tachycardia, palpitation, insomnia, and glycosuria. No exophthalmos or eye-signs. B.P. 150/90. PR 120, BPR 80, BMR minus 8%. During the first five months of observation there were three peaks on the weight curve and these corresponded with the appearance of glycosuria and elevation of the pulse rate. Lugol's was then given, 15 drops daily for three weeks, and the PR dropped at once to 94 despite another increase in body weight. Interruption of iodine for six weeks resulted in a rise in PR to 110. Iodine was then resumed for three months, with disappearance of palpitation, insomnia and nervousness and reduction of the thyroid enlargement. During the 7 months since iodine was discontinued a moderate tachycardia has persisted, the PR varying from 94 to 106, but the thyroid enlargement has disappeared and the patient continues to feel well in all respects. The BPR remains at 80. The metabolic rate is still unstable and successive graphs, taken at intervals of only a few minutes, show marked variations.

Case 6. A woman aged 46 with circumscribed thyroid enlargement dating from her first pregnancy 12 years ago. Severe nervousness and palpitation began 1 year ago. PR 106, BPR 90, BMR plus 25%. Lugol's solution in doses of 10 drops daily for 2 weeks brought the PR down to 88, with improvement in the symptoms. Upon discontinuing iodine for 1 month the PR rose to 120, while 2 weeks after resuming it in doses of but 5 drops daily the PR dropped again to 70 and all nervousness disappeared. Iodine was continued in small doses and 7 months later the BMR was plus 1%, BPR 80 and PR likewise 80. The patient felt very well and there was no nervousness. She then had an attack of grippe and was in bed for 2 weeks with fever, during which time she stopped taking iodine. When she reappeared her PR was 115, BMR plus 29%, though the BPR remained at 80. Large doses of iodine in a week brought the BMR down to plus 6%, with PR and BPR both at 80. She feels and looks well and the thyroid is scarcely palpable.

This case again illustrates the effect of iodine upon this syndrome, with relief of symptoms, shrinkage of the thyroid enlargement, and stabilization of the pulse rate. It also shows again the effect of an intercurrent acute infection in increasing the demands of the body upon the thyroid.

Case 7. This woman first came to the clinic 12 years ago, at the age of 37, with severe diabetes. She had a moderate irregular enlargement of the thyroid, with nervousness, palpitation, tachycardia and tremor, the PR ranging between 100 and 130. During this entire period the symptoms remained about the same, no progression or improvement being noted. Over 2 years ago Syr. Ferrous Iodid was given for 1 month, with a drop

in PR from 130 to 100 and immediate rise again when the iodine was discontinued. Ten months later the BMR was plus 50%. Two X-ray treatments were now given and were followed by a drop in the BMR to minus 2%, with PR 100 and BPR 76. Two months later there was an increase in PR and Lugol's solution was then given for one month, the PR dropping from 132 to 92. The patient felt much better and the thyroid was much smaller, so iodine was stopped, although the PR continued to be unstable. Eight months later the BMR had risen to plus 10% and the BPR was 92. Lugol's solution was now given for one month in doses of 30 drops daily, following which the BMR dropped to minus 8%, the BPR to 80 and PR to 92. No thyroid enlargement could be made out and the patient felt well.

These patients are still under treatment. They cannot be said to be cured, for two reasons. In the first place, the thyroid may still remain incapable of responding when increased demands are made upon it, without a recurrence of symptoms. In the second place, there may be an underlying fault, outside the thyroid gland, which creates an excessive demand upon the thyroid. We feel, however, that our experience has shown that iodine is, at least in some cases, able to relieve the symptoms when they occur and avert the necessity for surgical treatment. Some cases have not responded so well to iodine, and until a much larger amount of material is available the continued treatment of these cases with iodine must be regarded as experimental. We wish, however, to emphasize that we have encountered no contraindications as yet to the continued use of iodine except failure to respond satisfactorily to it. We have not yet seen an increase in toxic symptoms follow upon the use of iodine, nor have we seen, in patients who responded to iodine at the outset, a later failure to respond.

ON THE MECHANISM OF INSULIN ACTION

ERNST FRIEDRICH MUELLER (Germany)

HERBERT J. WIENER

(Delivered before the New York Academy of Medicine May 21, 1925)

The vast amount of research work bearing upon carbohydrate metabolism and Diabetes Mellitus in particular which followed the epoch-making discovery of von Mering and Minkowski in

1889 (total diabetes as a sequence to total pancreatectomy in dogs), has still failed to penetrate the veil of mystery surrounding the actual etiology of Diabetes Mellitus. If the mechanism of insulin action were known, the knowledge gained thereby might well prove a powerful illuminant in this dark field of pathology. In other words, if we knew how insulin acted in re-establishing the diabetic body's potential toward a normal carbo-hydrate metabolism, we might be able to discover the missing pathological link between the picture as represented by a totally depancreatized dog and a severely diabetic human being. It has been proven that insulin aids in the fragmentation of the sugar molecule in the presence of extracts of certain body tissues such as liver or muscle. It has also been shown that the administration of insulin by injection causes the formation of glycogen in the liver of a depancreatized dog. Insulin may therefore be properly defined as a true hormone, *i.e.*, a pharmacodynamic substance secreted by specialized tissue and carried by the circulation to the sites of its activity. However, the mechanism of the physiological action of this hormone remains obscure. The experimental work to be described was done with the object of gaining an insight into the actual mechanism of insulin action.

I

Diabetics as well as individuals with a normal carbohydrate metabolism were studied. The experiments were done in the morning, with the subject in a fasting condition, or following a breakfast of definite composition finished at a known time. Two experiments on the same individual, employing like doses of insulin (Lilly U-40) from the same ampule, and under the same dietary conditions but differing in the method of administration of the insulin constitute a series, and are so referred to in the text. A total of 33 such series are here reported. The blood sugar was determined before the insulin injection, and at one hour, two hours, and four hours following the injection. In a number of cases the same blood sugar curve, but omitting the insulin injection, was determined. In six additional series of one hour only the blood sugars were determined at twenty minute intervals following the injections.

Twenty-nine (88 per cent.) of the thirty-three series show a greater reduction in the blood sugar level at the first hour following the intradermal injection than following a subcutaneous injection of an equal dose.

At the second hour twenty-three (70 per cent.) of the intradermal injections resulted in a lower blood sugar level than did the subcutaneous injections.

At the fourth hour, twenty, or 67 per cent., of the series showed a greater hypoglucemia with intradermal administration.

The difference in the response to the two methods of administration as manifested by the hypoglucemic effect is most striking with the smallest doses (*i.e.*, 5 units) and at the first hour after the injection. The maximum difference falls at the first hour and there is a gradual decrease in this difference at the subsequent time intervals.

This difference in response to the two methods of administration varies from case to case. The greatest differences in the hypoglucemic effect occur in the cases of moderately severe diabetes. The least differences were noted in non-diabetics. A consistently less great response to the intradermal injection occurred in one case of severe diabetes.

Insulin injected subcutaneously enters the blood stream and is brought to the tissues more promptly than when the same dose is given between the layers of the skin. Kasahara¹ showed that the resorption of true solutions, colloidal solutions and cell and bacterial suspensions when introduced intracutaneously is materially delayed as compared to identical injections administered subcutaneously. Our results cannot therefore be explained by a quicker resorption of the intradermally introduced insulin. From the results of the 20 minute series it was apparent that there is a blood sugar lowering effect of intradermally injected insulin before any of the hormone can possibly be present in the blood stream, for the subdermally administered equal dose of insulin shows no such effect twenty minutes after the administration. We conclude from the observations reported above that insulin injected intracutaneously must have an initial specific

¹ Kasahara, Zeitschr. f. d. ges. exp. Med. 1925, XLIV, 294.

action produced in some way other than through the usual contact of the hormone with the tissue fluids and cells.

II

Our findings imply the transmission of a specific stimulus between the intracutaneous area of the skin and the organ or organs the activity of which governs the carbohydrate metabolism in the mammalian body. We postulate the pathway which carries this stimulus to be the fibers of the parasympathetic nervous system. Claude Bernard showed that stimulation of certain parts of the parasympathetic system results in increased glucose formation in the body. M. Eiger,² working with turtles, showed that stimulation of the peripheral end of the cut vagus caused increased glycogenesis, despite exclusion of the pancreatic activity. H. Meyer³ showed that injection of pancreatic extract inhibits glycogenolysis in the liver. From these experiments it is to be assumed that stimuli may travel via the vagus nerve to the liver and there cause actual increased liver cell metabolism, and also that such stimuli may travel to the pancreas, whereby an equivalent internal secretory influence of the liver cell metabolism may be registered. In both cases vagus stimulation results in the inhibition of glycogenolysis. Minkowski's experiments³ have shown that not only extirpation of the pancreas but also disconnection of the nerves between pancreas, liver and duodenum results in diabetic symptoms.

The response of the liver cell in the form of glycogenetic activity is governed to a large extent by the amount of glycogen in the liver at the time, and this response will be decreased if the liver is rich in glycogen. In two non-diabetics the blood sugar levels following the injections of 10 and 20 unit doses of insulin intradermally as well as subcutaneously were studied. It was found that there was a quick recovery to the normal blood sugar level in both, as well as a reversed response in one of the subjects. These results can be accounted for on the basis of the degree of glycogen saturation of the liver cells.

² Eiger, *Centralbl. f. Physiol.* XXX.

³ Quoted from L. R. Mueller, *Die Lebensnerven*, Berlin, Springer, 1924, 282.

III

The glucolysis occurring in the bloods drawn before insulin injection and at stated intervals thereafter was determined in nine series. The average of the absolute values in mgs per cent. of the sugar destroyed when the blood was allowed to remain in the incubator at 37 ° C. for two hours were as follows:

	Insulin by intradermal method	Insulin by subcutaneous method
Before injection	24 mgs. %	21 mgs. %
One hr. after injection . . .	19 mgs. %	28 mgs. %
Two hrs. " " " "	22 mgs. %	30 mgs. %
Four hrs. " " " "	15 mgs. %	21 mgs. %

As may be seen from the table the one-hour post intradermal-injection blood failed to manifest greater glucolytic activity than did the blood drawn before insulin injection. On the other hand, the one-hour post subcutaneous-injection blood manifested a greater glucolytic activity than did the blood drawn before the injection. In fact the glucolytic activity of the blood drawn following intradermal injection remained constant or diminished slightly as the blood sugar level decreased, whereas by the subcutaneous method the glucolytic activity of the parallel blood was increased at the two-hour post injection period as well as at the one-hour post injection period.

In severe diabetes the glycogenetic function of the liver is markedly reduced or is even absent. The severity of the diabetic condition is mirrored by the results of the various series as done in these experiments in that the concentration of glycogen in the liver cells governs the degree of difference in response to the two methods of injection.

IV

Experiments done by one of us⁴ on rabbits proved that if the parasympathetic pathways are blocked by atropin the normal blood sugar lowering effect of intradermally injected insulin does not appear. In control tests it was shown that atropin itself in the doses used does not affect the blood sugar level. If rabbits

⁴ E. F. Mueller. To be published.

are injected with atropin every 30 minutes and the parasympathetic pathways are thus cut off during the entire period of observation, the result upon the animal's reaction to various methods of insulin administration is as follows: The blood sugar curve following intravenous administration is the same as the curve in the same animal without atropin. After subdermal injection the hypoglycaemic effect is slightly less marked than in the non-atropinized animal. If the insulin is administered intracutaneously in an atropinized rabbit the blood sugar level is not affected for a period of almost an hour. During the two succeeding hours a hypoglycaemic effect is noted, but it is only half as great as in a non-atropinized animal.

These experiments indicate that the fibers of the parasympathetic nervous system may carry the specific stimulus initiated by the insulin injection, if given intradermally or subdermally. That area in the body which is most rich in the parasympathetic nerve endings will serve as the most effective area for the localization of the depot if the reaction to this effect is to be given the greatest prominence. This effect is totally lacking in the intravenous administration, partly demonstrable by the subdermal administration, and very much more definitely present when the insulin is deposited intracutaneously. The degree of intensity of this stimulus does not depend upon the dosage; the effect of this stimulus, though gradually diminishing, will persist as long as the deposit of active insulin remains. With the beginning of resorption of the insulin from the depot wherever located, into the circulation, the hormone effect is initiated, and increases with increasing concentration of the active insulin in the circulation. As resorption into the circulation proceeds, the hormone effect increases and reaches its maximum, and the specific effect of the stimulus via the parasympathetic nervous system gradually diminishes and disappears.

Irrespective of the condition of the subject's carbohydrate metabolism at the time of the experiments, it was found that under conditions as nearly constant as possible, the two methods of administration differed in their effect upon the blood sugar level. As between one case and another this difference could not

be interpreted as a criterion of the clinical severity of the disease. But it is possible that a study of the difference in the blood sugar level in the individual diabetic patient resulting from intradermal and subcutaneous injections of insulin may prove a useful basis for a revised clinical classification of the disease. Such studies might also conceivably have a bearing upon prognosis and treatment.

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EARLE CONNER, 284 Lexington Avenue, New York City; born in Chautauqua County, New York, October 6, 1861; graduated in medicine from the University of the City of New York, in 1881; elected a Fellow of the Academy January 5, 1911; died June 8, 1925. Dr. Conner was a Fellow of the American Medical Association, and assistant surgeon at the Knapp Memorial Hospital.

HENRY ARNOLD FAIRBAIRN, B.A., M.A., 249 McDonough Street, Brooklyn, N. Y.; born in Catskill, N. Y., May 5, 1855; graduated in medicine from the University of Virginia, 1877, and the College of Physicians and Surgeons, New York City, 1878; elected a Fellow of the Academy October 6, 1887; died June 11, 1925. Dr. Fairbairn was a Fellow of the American Medical Association, Fellow of the American College of Physicians, member of Pathological Society, physician at St. John's, consulting physician at Brooklyn Swedish Hospital, Brooklyn State Hospital, Long Island College Hospital and Hebrew Orphan Asylum, and House of St. Giles the Cripple.

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BULLETIN
OF
THE NEW YORK
ACADEMY OF MEDICINE

INSTITUTED 1847
SECOND SERIES, VOL. 1, No. 4

JULY, 1925



PUBLISHED MONTHLY BY
THE NEW YORK ACADEMY OF MEDICINE
LANCASTER, PA.
Lime & Green Sts.
NEW YORK
17 W. 43d St.

1925

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Entered as second-class matter, April 6, 1925, at the postoffice at Lancaster, Pa., under the Act of August 24, 1912.

Subscription \$2.00 per year. Single copies, 25 cents.



DAVID HOSACK, M.D.

1769-1835

(From a painting by Sully, engraved by Chas. Heath, in "Lives of Eminent American Physicians and Surgeons of the XIXth Century," ed. by Dr. Samuel Gross. Phila.: Lindsay & Blakiston, 1861.)

THE NEW YORK ACADEMY OF MEDICINE

VOL. I

JULY, 1925

No. 5

DAVID HOSACK

David Hosack, as Mumford says, "did not belong to the Revolutionary doctors. He came to manhood after the war was over and is to be classed with the new and progressive generation." Yet, coming, as he does, between his preceptor Bard and his own pupil Francis, he lacked, in some measure, the scientific talent of the one and the literary facility of the other; and is now more to be esteemed as the solid, stable surgeon and practitioner, who performed important operations, edited medical journals, wrote profusely, worked hard for necessary reforms, cultivated botany and mineralogy, after the old 18th century tradition, and managed withal, to hold down as many different chairs in the medical faculty as did Nathan Smith at Dartmouth and Bowdoin.

Hosack, the son of a cadet of a Scotch family who had served as an artillery officer in the French war and later settled in America, was born at 44 Franklin Street, New York City, on August 3, 1769. On his mother's side he was of French and English extraction. Prior to entering Columbia College in 1786, he had received a good classical education from various tutors and in 1788, began to study medicine under the surgeon Richard Bayley, but took his actual A.B. degree at Princeton in 1789 and his medical degree at the Pennsylvania Medical College in 1791. Hosack's preceptor Bailey had granted to his pupils the use of a room in the New York Hospital (reopened 1791) for dissecting purposes, and in this way the young student became implicated in the riot known as the "Doctor's Mob." In the ensuing fracas, he was struck on the head by a stone, knocked

senseless and only saved by the kindness of a neighbor, who picked him up and took him home. Upon graduation, he married Catherine Warner, and commenced practice in Alexandria, Virginia, which then had hopes of becoming the capital of the United States. The experiment was brief. His practice soon grew to ample proportions, but the fees (at that time probably less than 25 cents each) amounted to nothing, and, as the prospects of the little town dwindled, he withdrew, in a year's time, to New York. Here he soon concluded that he would need better training to succeed, and leaving his wife and infant with his parents, he sailed for England, spending two years in London and Edinburgh. Upon the night of his arrival in Liverpool, he met Robert Burns at a social gathering and was soon taken up and made much of. He met or saw all the celebrities of the time, cultivated botany with Sir Joseph Banks and others, attended John Hunter's funeral, and communicated a paper to the Royal Society on the mechanism of vision, which was printed in its Transaction. On his voyage homeward in 1794, which lasted fifty-three days, typhus broke out on board, and Hosack was immediately launched into practice. One of his fellow travellers was a wealthy brother of Lord Ellenborough who was so impressed with Hosack's abilities that he introduced him to Alexander Hamilton and Aaron Burr, whose physician he became. In 1795, Hosack was offered the chair of botany (*materia medica*) in Columbia College and before the year's end he was busy with an epidemic of yellow fever in the city. It was at this time that he attracted the attention of Samuel Bard, who took him into partnership and to whose practice he eventually succeeded in 1798. Hosack's fortune was thus made at the start. Having lost his wife and child, he married in 1797, Mary Eddy by whom he had nine children. He became a kind of expert in the treatment of yellow fever, which he regarded as a contagious disease. Upon the foundation of the College of Physicians and Surgeons, in 1807, he was appointed professor of botany and *materia medica*, later succeeding to the chair of surgery and midwifery, and, upon the fusion of the College of Physicians and Surgeons with the Columbia College School

(1811) he succeeded to the chair of practice and clinical medicine, thus holding six different chairs in nineteen years (1807-26). In 1801 he founded the Elgin Botanical Garden at Hyde Park, which he eventually presented to the College. He was also instrumental in the foundation of the Humane Society, in the remodelling of the City Dispensary, and gave medical lectures to policemen. In 1810 he founded, with Dr. John W. Francis, the Medical and Philosophical Register (4 vols., 1810-14), one of the best medical journals of the period. In 1829 he retired from practice, living thereafter at his country house at Hyde Park. Just before his retirement from practice, Hosack married for a third time, and during his six remaining years, his new wife, an amiable widow, continued the tradition of his Saturday evening receptions, at which Irving, Cooper, Bryant, Halleck and other celebrities of the time were frequent guests. Harriet Martineau has left an enthusiastic description of this pleasant Hudson retreat. Like Samuel Bard, Hosack was a scientific farmer and stock raiser, occupied with these avocations until his death of apoplexy in December, 1835.

Hosack's reputation in medicine was based upon his success with the sudorific or mild treatment of yellow fever during the eight epidemics of 1795-8, 1803, 1805, 1819, 1822, upon his eighteenth century predilection for botany, his industry as writer and editor, and his innovations in surgery, notably the treatment of hydrocele by injection (1795), the first American ligation of the femoral artery for aneurism (1808) and his persistent advocacy of the open air treatment of wounds (1813). His Medical Essays (3 volumes, New York, 1824) include observations of the nature of contagion, on yellow fever, on foetal and infantile diseases, on angina pectoris, anthrax, elephantiasis, goitre, gout, tetanus, with biographies of Caspar Wistar, and Hugh Williamson, essays on ancient surgery, medical police, Ballston Spa, and suchlike; but nothing of outstanding importance save the Royal Society memoir on vision (1794) and the ligation of the femoral (1808). In the American Medical and Philosophical Register (1814-19), edited by Hosack and Francis, we find Hosack's classification of diseases, his history of the medical schools of

New York and Philadelphia, his observations on croup and hydrophobia, and such suggestive titles as fever in the drowned lands of Orange County, N. Y., and proofs of the contagion of yellow fever in the pure air of the country. That the two editors were informed with the historic spirit is evidence by an autograph letter of Franklin in facsimile and the editorial gossip, from which a picture of the medical culture of the time might be easily constructed. On the historic side, Hosack's best book is perhaps his "System of Practical Nosology" (1818), which, like Wunderlich's *History of Medicine*, gives the different classifications of diseases made by physicians of the 18th century, from Linnæus and Sauvages to Young and Pinel. His treatise on the Theory and Practice of Physic, edited by Ducachet, was published after his death, in 1838.

Sully's painting of Hosack shows a sturdy, vigorous, dark-eyed, blunt-nosed figure of Scottish type, whose lawn stock is folded in the fashion of the Geneva bands worn by physicians in the eighteenth century. His rugged feature tells something of the kindly hospitality and generous nature which distinguished alike his public benefactions, his silent acts of charity, and the conversaciones held every Saturday evening at his house. If he had latent in his composition anything of

"The thick Scots wit that flatters, scolds, defies,

The braw Scots tongue that fells you like a mace,"

it was not apparent in any known transaction of his life. As a teacher of medicine, he had a sonorous, vivacious, expressive delivery, which relieved the usual monotonies of medical lecturing, and so won his pupils. Three times in his life he took friendless young men into his home and educated them. All came up to expectations, one a voluntary martyr to the care of yellow fever patients in the epidemic of 1798, another, at first an indifferent student, later a clergyman of means; the third no less than Professor Delile, of the School of Medicine at Montpellier and Superintendent of its Jardin des Plantes. Hosack's son, Dr. Alexander Eddy Hosack (1805-71) whose memory is preserved in Hosack Hall in the Academy of Medicine, was a capable surgeon. This success with the young bespeaks the physician

of Osler type as plainly as the Elgin Botanic Garden, the Fever Hospital, the cabinet of minerals donated to Princeton College and the many other charitable and public-spirited actions which honored Hosack's professional career.

F. H. GARRISON

THE WESLEY M. CARPENTED LECTURE ON SEROLOGICAL REACTIONS IN SYPHILIS

BY THORWALD MADSEN

Director of the Serological Institute, Copenhagen, Denmark

(Delivered before The New York Academy of Medicine, October 16, 1924)

Among the many aids which laboratory investigations have of late years placed at the disposal of the doctor and the hygienist, the serodiagnostic reactions in syphilis are among the most prominent. This does not only apply to the specialist, the syphilologist, who both utilizes the reaction for a purely diagnostic purpose in recognizing the disease, and also to follow its further course and to obtain proofs of the result of the treatment. As a matter of fact, access to this reaction has been of greater importance to the clinic than perhaps is always realized.

The fact is that in various hospital sections the regular serodiagnostic examination of the blood for syphilis has been introduced between the routine examinations which are made of all patients; this is true for instance of maternity homes, children's homes, etc. It is therefore clear that it is of the greatest importance that access to having this important reaction made be arranged in the best possible manner. In this respect, however, the various countries have gone very differently to work. In most places access to these examinations has been allowed to arrange itself, and the result is that besides the excellent, first-class diagnosing stations of this kind, there are, unfortunately, many others which leave very much to be desired and where the reaction is proceeded with less conscientiously. It is therefore no wonder that complaints are heard time after time about

the uncertainty of the carrying out of the reaction. It happens frequently that the same blood sample, tested at different laboratories, gives a positive result at one place and a negative result at another, and neither is it a rare occurrence that the blood sample sent in to the same institution on several consecutive days comes back with a different reply every time.

In Denmark another way has been chosen, as right from the beginning all the serodiagnostic examinations have been centralized in one place, the State Serum Institute, where the examinations are made according to a uniform plan. In conformity with the Danish system for the combatting of venereal disease, which as a matter of fact has been in use for more than 150 years, but has been more clearly defined by later laws (the last in 1906), every Dane, whether rich or poor, has the right to free treatment for venereal disease and, in accordance with that system, the test for W. R. is also made without charge to the patient. For private patients who do not desire public free treatment, the reaction is made for a very low fee. The advantages of this centralization, the effect of which is that at the Serum Institute between 200 to 300 samples are examined daily, are that one avoids the uncertainty which may arise through the test being made at different places and by different methods. The circumstance that such a large number of tests are made daily ensures a degree of certainty that the reaction is made in a regular manner, as any deviation, for instance owing to peculiarities in the complement, is immediately observed in the great material. It furthermore ensures intimate co-operation with the hospitals, and thus one constantly has the opportunity of checking the reaction; this also gives the hospitals an opportunity of making extensive scientific investigations into serodiagnostic questions. Naturally, this centralisation on the other hand involves the Institute in considerable responsibility for the correct carrying out of the method.

Perhaps it may be of interest in this connection to mention that just this centralisation has made it possible to introduce a *registration of all syphilis patients*, for which a desire has often been expressed in various quarters, but which formerly met with great difficulty in practice.

As the American colleagues to whom I have had an opportunity of showing this registration have been extremely interested, I have thought that it may be of interest to those present here to see how it is carried out.

The principle which forms the foundation of this registration, and which has been described by Head Physician Jersild, is that every Danish patient with syphilis will, as a result of the free treatment, sooner or later have a serological test made of his blood; as a matter of fact this has proved to be correct, with so few exceptions that in this connection it is of no importance.

Particulars are required of seven different things on the form which accompanies the blood sample sent in:

- (1) Sex of patient
- (2) Year of birth
- (3) Month " "
- (4) Day " "
- (5) The first letter of the surname, with the addition of the first letter in the surname if this should be changed by Royal Patent or by marriage
- (6) Information as to when the syphilis was first diagnosed, and
- (7) By whom.

It has been proved that this information is in reality sufficient in the great majority of cases to identify the patients and, what is of great importance in such a file, without knowing the patient's name. The last two particulars, time of infection and the name of the doctor consulted, are absolutely necessary, and as a rule the patients remember very clearly the often horrible and significant point of time when they first consulted the doctor about their disease. In fresh cases especially it is obvious that this information can be given with sufficiently great accuracy.

They are entered upon an index card in a file, on which there is also information as to which doctor or hospital section has sent in the blood test, the hospital section's journal number, the Serum Institute's serial number and the result of the serological reaction in W. R. and other tests. This registration has been

working since 1921 and has proved to answer its purpose very satisfactorily.

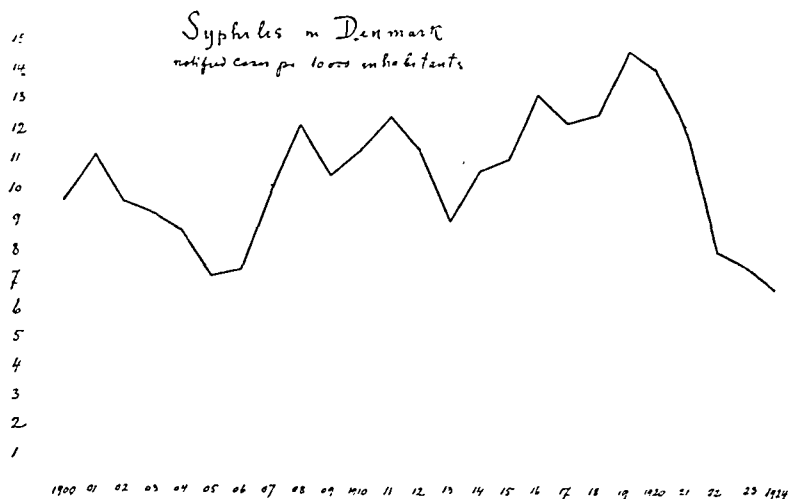
1901	VIII	11	C	former O	6/1.22	Hospital. Vejele.	♀	
Year Aar	Month Md.	Day Dag	Hospital or Doctor	J. No.	W.R.	No.	Titration of W.R.	Σ
1922	I	7	Hospital Vejele	14	Blod	38513	#	
-1-	IV	19	-1- Esbygaard	420	-1-	2542	+	
-1-	V	24	-1- -1-	540	-1-	8309	÷	
-1-	VII	3	Dr. Blem Lorez	324	-1-	13508	÷	
1923	VI	20	Hospital Copenh	339	-1-	11954	+	1,5
-1-	VIII	18	-1- -1-	442	-1-	19003	÷	÷
-1-	X	3	Policlinic -1-	15820	-1-	43081	÷	÷
-1-	XII	25	Dr. Jensen Kongs	679	-1-	32845	#	2,5
1924	I	2	Hospital Odense	32	-1-	39807	#	2,5
-1-	II	3	-1- -1-	-1-	-1-	45835	+	1,5
-1-	IV	18	Dr. Hansen Aarhus	120/24	-1-	62804	÷	÷

I may emphasize some of the advantages of the system. A doctor or hospital is able to keep track of the patient later on in life, which is otherwise difficult, for most often these patients belong to a class of vagabond tendencies. But on application to the registration bureau it is possible to state where the patient has from time to time been treated and the result of the serological reaction, without the bureau knowing anything about the name of the patient. This is often of importance to the treating doctor; if, for instance, it is desired to find out the results of a certain treatment, it is naturally important that one can to a certain degree find one's patients and find out the further course of the disease. This of course will be of particular importance in cases of late syphilitic diseases, such as general paralysis, tabes, etc.

The card shows clearly how a patient has gone from one doctor or hospital to another. Another advantage is that one has the possibility of obtaining statistics of cases of syphilis, which otherwise are very difficult to compile. One can for instance work out the annual number of cases of congenital syphilis and, on the whole, the number of fresh cases, even if these patients are, perhaps, not notified immediately after their infection, as at this juncture W. R. is by no means always taken, although somewhat later on W. R. will always be performed during the treatment.

The question of compiling reliable *statistics* is of course one of the burning questions in the combatting of this disease. On the other hand the difficulties have turned out to be exceedingly great.

In Denmark the notification of all cases of syphilis (although not nominative) has been compulsory ever since last century, and, based upon the *official* notifications, a graph of all syphilis cases has been plotted, as you will see:



We are, however, quite aware that these statistics suffer from important defects which one has tried to get over in a variety of ways. One of the greatest difficulties is the frequent double

notifications as a result of patients going from one doctor to another. Sometimes several doctors one after the other, and finally a hospital section, will notify the same patient, whereas on the other hand less careful doctors omit to notify them. On this point registration is an excellent means of getting reliable statistics.

I have dwelt upon this system of registration, because it is possible that the form can be used elsewhere, even in the United States, where the interest in vital statistics is so greatly developed.

With regard to the Danish statistics I must not omit to draw your attention to a point of considerable interest. You will see that the number of notified cases of syphilis after 1906 grows steadily, with a remission in 1913, after which it again rises during the war and reaches its culmination in 1919, whereafter it falls suddenly.

This agrees with what has been observed here and there in the belligerent States, but it is perhaps of some interest that a country like Denmark, which has not been in the war, has taken part in the general increase. It is presumed that the cause was to some extent the calling up of the defense force and partly a certain disturbance of moral ideas which at that time was traceable over Europe and which also infected our country, while another was particularly the largely increased incomes which at that time were spread over the community and thus, as so often before, were reflected in an increase of the cases of venereal disease.

It is interesting to see that this heavy increase has been succeeded by a sharp fall in the following years, and if I have attached importance to showing you this graph, it is because in many parts of the world, both in America and Europe, observers have been seared by the violent increase in the number of cases of venereal disease, and this has been the cause of forceful measures having been taken to fight this plague. In many places it has perhaps had this benefit, that it has shaken the medical authorities up to take energetic measures, which apparently have been crowned with success, for as you know the number of cases of venereal disease has fallen considerably during the past few

years. Naturally there will thus be an inclination on the part of the authorities to ascribe this decline to the measures they have taken.

Of course it will be of importance for the continued propaganda to be able to point to these results, but I cannot help pointing out that when one considers this phenomenon from a purely objective scientific point of view, one must be cautious about drawing conclusions as to the real cause of the decline.

If we look at the Danish graph it will be seen that the decline in Denmark has come *without* special new measures being introduced. Therefore when in other countries there has been a tendency to point to the decrease in the number of cases of syphilis as a proof of the utility of the measures taken, one should be a little cautious. However useful it might be to have arguments for a propaganda, one must, as scientific public health workers, remember that the course of epidemics has its own laws and is often only slightly affected by public measures.

The *serological methods* at present in use in the diagnosing of syphilis present a very motley picture, having regard to both the very different principles on which they are based and the manifold modifications in the methods which have gradually appeared. It is now possible to divide them into two main groups, as they base themselves upon complement fixation and the flocculation methods.

The *complement fixation methods* are the direct outcome of the method described by Wassermann, Neisser and Bruck in 1906, which was, as you know, based upon the phenomenon observed by Bordet-Gengou—the deviation of complement, and as a consequence the readings were taken by a hemolytic system. These methods again fall into two groups—those which work with active and with inactive sera.

In the latter the patient serum which is to be examined is inactivated by a half-hour's heating to 55°, whereby its complement is destroyed, and afterwards fresh guinea pigs' complement of a known strength is added. Various organ extracts are used as antigens; the official German directions demand the use of several extracts. A large number of the more exactly working

methods include a quantitative titration of the complement before it is used. Finally, some methods include a quantitative titration of the strength of the serum examined; this too is done in various ways: Boas, Thomsen, Kolmer, Müller and Renaux perform the titration with diminishing doses of serum, Calmette and Massol, Kaupp prefer varying quantities of complement for this.

In the "active" methods the fresh human blood's own content of complement and amboceptor are used, but as some blood specimens do not contain sufficient of these substances, which weaken rather quickly, foreign complement is now frequently added. The best known methods have been worked out by Stern, Noguchi, Müller, Landsteiner, Hecht-Weinberg, Latapie Mutermilch, Hecht-Gridwohl. It is maintained that the advantage of these methods is that, by leaving out the inactivating, one avoids weakening the sera and, as regards a number of the modifications, that time and money are saved in the preparation of complement and amboceptor.

The development of the *flocculation methods* began fairly early. In 1907 it was shown by Landsteiner, Müller and Pötzl, Levaditi and Yamanoughi and Porges, that the effective substance which reacted with syphilis serum was not present solely in organ extracts of luetic cases, but also in extracts of normal organs. Further, this effective substance was shown by them to be contained almost solely in the alcohol soluble fraction, its association therefore with a lipoidal substrat thus being demonstrated. In the same year Michaelis noted the formation of a visible precipitate when the extract of a luetic liver was brought in contact with a luetic serum. These observations gave the impetus to attempts to substitute for the complicated system of the Wassermann reaction a flocculation test involving two ingredients only. The further development through Porges, to some extent in collaboration with Meier, and later with Elias, Neubauer and Salomon, Sachs and Rondoni, Browning, Cruickshank and McKenzie, where the use of lecithin, sodium glycolat and, especially, cholesterin as an admixture to antigen was gradually tried, led to Herman and Perutz's reaction, probably

the first to attract the interest of the clinicians. However, none of these methods could compare with complement fixation methods, and it was only when Jacobsthal (who reverted to organ extract as antigen), Bruck and Hidaka, Hecht and others, Meinicke (1917) and Sachs and Georgi (1918), after meritorious work, came forward with their methods, that the flocculation tests seriously began to appear as competitors of the old Wassermann test.

The latest progress in this domain is the Sigma method proposed by Dreyer & Ward, 1921, who follow in principle the method of Sachs-Georgi, but with a more stable antigen and a refined technique involving the quantitative expression of all degrees of flocculation, so that the test can be so conducted that it can lend itself to accurate standardization in terms of standard units. In 1922 Kahn described a method based upon a similar principle which, owing to its easy accomplishment, has been widely used during the past year or two.

For these latter three methods patient serum is used, inactivated at 56° and, as antigen, extracts consisting of the non-aceton soluble part of calf or ox heart extracted by alcohol.

Verne's method described already in 1911, occupies a special position, being based upon a photometric reading of the opacity which arises by mixing a syphilis serum with a specially prepared horse heart extract. The method is characterized by the care with which the technical details are carried out, but for this reason craves a large and expensive instrumentarium.

Of quite recent date are the "Trübungs reactions" described by Meinicke, Sachs, and others, the principle of which is that by adding tolubalsam and similar substances to the organ extract the flocculation is accelerated, so that it appears clearly in the course of an hour, and in the form of great opacity in the positive sera. The advantages of these methods are their simplicity and rapidity. By Meinicke's method inactivating of sera is unnecessary, and the result can be seen even after the course of about two hours.

It is beyond the scope of my address to go into the details of the techniques of all the methods which are now in use—it would

fill a thick book; neither shall I touch upon the many complicated theoretical questions which are attached to these reactions. I will, however, go into a more practical question: how can one compare these methods with each other? Naturally, this question is of great interest to the large number of laboratories all over the world whose task it is to make sero-diagnostic examinations of this kind and who may find it difficult to choose between the many existing methods.

A proposal by the British Ministry of Health gave the impulse to the attempt to procure some agreement between the methods for serological tests in syphilis. The proposal was that the possibility should be created for free treatment in various seaports of seamen infected with venereal disease. It was a natural thought that the countries which had wholly or partly introduced such a treatment for seamen in their own ports (apart from England this has been the case for a long time in Denmark), should desire the introduction of similar measures in other parts of the world.

Looked at from a public health point of view, this is of course extremely desirable. We know that particularly seamen with venereal disease often, owing to lack of treatment, get their syphilis developed to a particularly malignant and infectious degree, and that when they come ashore they are most dangerous sources of infection. It would therefore be in the obvious interests of all parties if an international agreement could be made that such patients, immediately after they arrived at a seaport, regardless of their nationality, could be given a proper and good treatment. This idea has been taken up by the Office Internal d'Hygiène Publique in Paris, which has drawn up a proposal for an international convention on this question. The proposal has been accepted by a number of States; it would be very desirable that the U. S. A. also accepted it.

The idea was, then, that these seamen should be given a little book, in which all the details with regard to their disease and their treatment should be entered, including the result of the serological reaction, so that the treating doctors in different ports should always be informed about the curriculum of the patient.

Here one met with the difficulty that not only is the value of the serological test very different in the various ports, but the description of the reaction results varies a great deal. Descriptions are used promiscuously with words such as: strong, weak, negative, positive, or at other places a system of signs, for example a number of crosses; at other places the strength of the reaction is expressed in figures. Naturally it would be very difficult for a doctor to know what all these signs meant. There was thus the need of trying to obtain greater uniformity in this domain.

When after the war the League of Nations' Health Committee took up the idea of establishing an international standardization of different sera, particularly diphtheria and tetanus serum, it was not a long step to try whether it were not possible to obtain a greater uniformity in the serological methods that were in use. The question was taken up at the serological conference which was held in London in 1921 at the invitation of the British Ministry of Health. A number of scientists attended who had especially wide experience, both theoretical and practical, in this domain, and a working plan was agreed upon.

It was agreed that it would be extremely difficult to bring about greater uniformity in the methods which were based upon complement fixation, that is to say all the methods which are called W. R. in its proper sense. It was taken for granted that these methods in the various laboratories had gradually been developed to a high degree of perfection, differing in the hands of the various investigators, that one was satisfied with the method on which one worked and therefore would not be inclined to give it up for another complement fixation method if it did not offer particular, essential advantages. On the other hand, the newer precipitin and flocculation methods had attracted general attention, and here and there, in almost all the big institutions, these methods were being compared with the Wasserman method already in use. With regard to these flocculation methods there was a greater possibility of obtaining international agreement. They were everywhere carried out according to the instructions of the authors and had the advantage that they worked with a single extract, which was sent out from central

places, as a rule by the authors themselves. In this there was a possibility that one could obtain an international standardisation of these extracts in a manner which reminded one of that which was already being used, for instance in the standardisation of diphtheria serum, where standard sera from a few central laboratories such as the Ehrlich Institute at Frankfort, and the Public Health Laboratory at Washington, were sent out to all who wished to have their serum tested.

Thus it was agreed to make a comparison with the *flocculation methods* on the one side and *complement fixation methods* on the other side. A choice would then be made between the methods most commonly in use at the moment (1921) and most adaptable for a standardisation. The choice thus fell upon the *Sachs-Georgi* method, the *Meinicke method No. 3* and the *Sigma* method of Dreyer-Ward. It was of course not the intention to deny the deservingness of other methods to consideration, but as it was necessary, for practical reasons, to limit oneself to a restricted number of investigations in order not to extend the problem too widely, these methods were considered to be a suitable selection.

Vernes' method, which presented many points of interest, could not at that time be included, as the apparatus required for this is so expensive that a number of countries, especially at that time just after the war, would not be able to bear the necessary outlay.

The *Kahn* test was not published when these comparative experiments were started.

The institutions which took up this work were the Medical Research Council in England, which entrusted the investigations to Professor Harrison, expert to the British Ministry of Health, in collaboration with Prof. Dreyer of Oxford. Poland: the State Epidemiological Institute, Warsaw, Professor Hirschfeld. Belgium: the Pasteur Institute, Brussels, whose principal, Prof. Bordet, entrusted the work to the sub-director, Prof. Renaux. The German Institute for Standardization: the Institute of Experimental Pathology at Frankfort, Prof. Kolle; the Cancer Institute, Heidelberg, Prof. Sachs. Austria: Prof. Rudolph Müller's clinic at Vienna.

Thus they were all institutions and investigators who had especial knowledge of these reactions. It was very regrettable that the circumstances did not permit of the inclusion of some investigators from America in this work, but the distance was too great, especially when it was a question of exchanging specimens for investigation.

It was furthermore decided that the State Serum Institute at Copenhagen should act as the centre for these investigations and act as a connecting link between the laboratories in the forwarding of specimens, etc.

The extract which was to be used in the flocculation method was to be supplied direct by the authors and, through the central laboratory at Copenhagen, forwarded to the various investigating laboratories. This was for the purpose of excluding one of the sources of error which had formerly been so fatal, *i.e.*, the antigens were different.

All reports on tests were to include information as to:

- (a) Reliability of the method.
- (b) Complexity of technique.
- (c) Relative consumption of time by the method.
- (d) Expense.
- (e) Ease and accuracy with which the reaction can be observed.
- (f) Percentage of dubious results.
- (g) The extent to which the method yields quantitative results.

The various institutions were thus brought into connection with each other; extracts and information as to technical details were exchanged, and work was ardently commenced, so that at the time of the second International Conference, which was held the following year (November, 1922), at the Pasteur Institute in Paris, a large number of detailed reports were to hand from the various institutes.

This work, however, did not give any clear result; of the nine reports it appeared that most of the investigators had some good results, others especially good results with the flocculation reac-

tions as compared with W. R., but none of them to such a degree that they considered they could give up W. R. in favor of the flocculation methods. Other investigators were still of the opinion that W. R. was superior to the flocculation test. This conference was of great utility, for it gave those present an opportunity after about twelve months' intensive work in the same field to exchange views on technical experiences.

It was agreed that it was necessary to continue the work, for one reason because as a result of the reports and the conference it was clear that in spite of all there was no exact uniformity in the manner in which the reactions had been made. It was thus agreed that the tests should be continued with certain technical changes and improvements; the State Serum Institute in Copenhagen should also endeavor to collect specimens of series of syphilis serum and non-syphilis serum. These specimens were to be divided into five equal portions, one of which was to be sent to each of the following laboratories:

Professor Müller

“ Bordet
 “ Wassermann
 “ Harrison
 “ Hirzfeld

To obtain as great a concordance as possible, all specimens from the same patient were to be examined on the same day in all the institutions mentioned. In this manner it was hoped to obtain a comparison as to how W. R., carried out with the same blood but in different laboratories, would turn out, for it had gradually become clear how extraordinarily difficult it is to get these sensitive reactions carried out in exactly the same manner in different places, even if they were carried out by the most competent persons.

This had already been apparent at the conference in Paris, and was confirmed by a journey undertaken by one of my assistants shortly afterwards to a number of the participating laboratories. On going from one place to another it was ascertained that there was a number of variations in the techniques of the

flocculation reactions—variations which were apparently small and insignificant, but which were in reality absolutely fundamental, a matter which I will revert to later. On this occasion it was possible to gradually bring these methods into considerably more uniformity than was previously the case.

It also turned out with the blood specimens which were sent out from Copenhagen to various laboratories that the replies were extremely different, not alone as regards W. R. itself, but also with regard to the three flocculation tests which were investigated. Very noticeable were the differences which appeared by the method which was expressed quantitatively in figures—the Sigma reaction, and Table 1 shows this fully. In the tables are first shown the serial number of the blood specimen, then under the heading “Bordet-Wassermann” is shown the result of the investigation by the various laboratories, thereafter in a similar manner Sachs-Georgi, then Sigma, and finally the Meinicke-Trübing reaction.

In the columns are given various signs which mean:

⊕	strong positive	=	> 3.8 Sigma units	
+	positive	=	1.5–3.9	“
±	doubtful	=	1.0–1.4	“
—	negative	=	< 1.	“
0 = reaction not made.				

Under the heading “Diagnosis” is given—the stage of syphilis in question, primary, secondary, tertiary, then syphilis latens, congenita, dementia paralytica. A point · shows to which column the diagnoses of the patients is to be referred; a “t” which is added (‘) means “treated.” Under the heading “Control” are shown control cases.

After this it was obvious that, despite the preceding close collaboration between the investigators, there must still be very considerable differences present. As far as the Bordet-Wassermann reactions proper are concerned this was, of course, not remarkable. These methods were in themselves different and were to be expected to give varying results; but as to the flocculation reactions, everything had been made that could be done to get them

Tab. 1.

No.	B. W.	S. G.	Z
1	Harrison	Müller	Möller
2	Harrison	Madsen	Madsen
3	Harrison	Madsen	Madsen
4	Harrison	Madsen	Madsen
5	Harrison	Madsen	Madsen
6	Harrison	Madsen	Madsen
7	Harrison	Madsen	Madsen
8	Harrison	Madsen	Madsen
9	Harrison	Madsen	Madsen
10	Harrison	Madsen	Madsen
11	Harrison	Madsen	Madsen
12	Harrison	Madsen	Madsen
13	Harrison	Madsen	Madsen
14	Harrison	Madsen	Madsen
15	Harrison	Madsen	Madsen
16	Harrison	Madsen	Madsen
17	Harrison	Madsen	Madsen
18	Harrison	Madsen	Madsen
19	Harrison	Madsen	Madsen
20	Harrison	Madsen	Madsen
21	Harrison	Madsen	Madsen
22	Harrison	Madsen	Madsen
23	Harrison	Madsen	Madsen
24	Harrison	Madsen	Madsen
25	Harrison	Madsen	Madsen
26	Harrison	Madsen	Madsen
27	Harrison	Madsen	Madsen
28	Harrison	Madsen	Madsen
29	Harrison	Madsen	Madsen
30	Harrison	Madsen	Madsen
31	Harrison	Madsen	Madsen
32	Harrison	Madsen	Madsen
33	Harrison	Madsen	Madsen
34	Harrison	Madsen	Madsen
35	Harrison	Madsen	Madsen

Tab. 1.

[illegible]

identical and yet, in spite of this, the results were not satisfactory. It was therefore decided to see whether it should not be possible to obtain the uniformity aimed at.

In order to determine the cause of these divergences the Health Committee of the League of Nations decided to convene a *Conference* at which the investigators were to make simultaneous tests of the same sera by the different methods. This Conference was held in the State Serum Institute of Copenhagen from November 19th to December 3rd, 1923. The following participated in the examination of the sera :

Dr. Harrison	}	Medical Research Council, London.
Dr. Wyler		
Professor Hirzfeld, State Institute of Hygiene, Warsaw.		
Dr. Madsen	}	State Serum Institute, Copenhagen.
Dr. Möreh		
Dr. Meinicke, Hagen, Germany.		
Professor Müller, Vienna.		
Dr. Mutermilch, Inst. Pasteur, Paris.		
Professor Otto, Kochs Institut, Berlin.		
Dr. Renaux, Inst. Pasteur, Brussels.		
Professor Sachs, Cancer Research Institute, Heidelberg.		

Some others participated, *e.g.*, from U. S. A.: Dr. Armstrong and Dr. Dyer, Public Health Service; Prof. Forssman from Lund, Sweden, and Prof. Petraghani from Firenze.

During this conference, 536 sera were tested during ten working days, that is to say, on an average 50 every day. The samples of serum, which were supplied by the Copenhagen hospitals, were preferably drawn from syphilitic patients, both treated and untreated, in different stages of the disease. No importance was attached to obtaining samples from patients with syphilis in the second stage, as these, as you know, react with all tests.

As it was the intention to weigh the values of the various methods against each other, it was in fact important to get samples from doubtful cases, and first and foremost a good control material, with special reference to conditions which are suspected to give unspecific results by some methods, as for instance tuberculosis, tumour and pregnancy.

Immediately after the bleeding of the patient, the sample was sent to the institute and examined the following day. As the quantity of some of this sera was rather small, such samples could not be tested by all the investigators with each of the methods in question. Only 11 cerebro-spinal fluids could be examined, as it was impossible to obtain sufficient material for all nine investigators in more than this number of cases.

The technique used for the different tests at this conference was the following:

For the workers who made W. R. with inactivated serum:

Dr. Harrison and Müller: his own described technique.

Dr. Hirschfeld: McIntosh & Fildes technique.

Dr. Madsen: Thomsen & Boas technique.

Dr. Renaux: the method described by Bordet & Rouleng.

Otto & Sachs: principally the technique prescribed by the German "Reichsvorschrift" with various antigens.

Whilst all these investigators worked with inactivated serum, Dr. Mutermilch used the technique which is the Pasteur Institute's official method and which works with active human serum. It is based upon the Bauer-Hecht procedure, modified by Levaditi and Latapie, Weinberg, Mutermilch and Latapie.

(2) The flocculation methods which were used were those of Sachs-Georgi, Dreyer-Ward (Sigma method), Meinicke's three modifications and Meinicke's "Trübungs reaction."

The technique was that described by the author. One had the advantage that two of these were present and made their own reactions.

The work done at this conference was extremely intensive. Each serum was subjected to in all 26 to 30 tests with various methods and different investigators. I do not suppose serum has ever been subjected to a more thorough serological examination. The clinical diagnosis which corresponded to the blood sample was not communicated to the investigator until he had handed in the result of the serologic test. Table 2 gives an idea of how the work was tabulated.

A number of cases, in which the results presented points of special interest, were re-tested, some of them during the conference, some of them afterwards.

Tab. 2.

Tab. 2.

No.	B. W.					S. G.					Σ					D. M.					M. T. R.					Diagnosis										Observ.	%
	Harrison	Madsen	Müller	Otto	Renaux	Sachs	Harrison	Hirschf.	Madsen	Renaux	Sachs	Madsen	Müller	Otto	Meincke	Hirschf.	Madsen	Müller	Otto	Meincke	Syphilis					Control.											
																					I	II	III	Lat.	Conf.	Tabes	D. p.	Tbc.	Gray.	Tumor	Mb. all & anal.						
109	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	109			
110	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	110			
111	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	111			
112	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	112			
113	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	113			
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115	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	115			
116	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	116			
117	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	117			
118	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	118			
119	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	119			
120	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	120			
121	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	121			
122	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	122			
123	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	123			
124	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	124			
125	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	125			
126	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	126			
127	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	127			
128	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	128			
129	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	129			
130	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	130			
131	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	131			
132	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	132			
133	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	133			
134	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	134			
135	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	135			
136	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	136			
137	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	137			
138	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	138			
139	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	139			
140	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	140			
141	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	141			
142	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	142			
143	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	143			
144	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	144			

Tab. 2.

SUMMARY OF CLINICAL DIAGNOSES

Total Syphilis 190								Total controls 345			
I	II	III	lat.	cong.	tabes	D.p.	?	Tub.	Pregn.	Tum.	?
19	42	37	40	3	3	34	12	90	103	14	138

Even if the material is too small to permit a thorough statistical treatment of the results of the tests, Table 3 gives an idea how the different methods compare in the hands of the different workers.

		Hansen	Hirschfeld	Madri- sche	Mewe- sche	Müller	Otto	Reimer	Sachs	Mut- mich
W.R.	Syph % pos	62	57	44		58	50	56	47	63
	- " % ?	4	2,7	6,8		2,7	6,5	4,4	6,5	2,7
	Cont % pos	0	0,6	0		0	0	0,0	0,5	2,2
	- " % ?	4,9	1,6	1,8		3	1,9	1	0,8	1,9
S.G.	Syph % pos	64	52	50		50	52	44	55	52
	- " % ?	1,3	5,5	7,7		3	6,7	7,5	3,3	3,4
	Cont % pos	0	0,3	0,9		0,3	0,5	0,4	0,5	0
	- " % ?	0,8	1,5	5,1		0	1,6	0,3	0,6	0
Σ (Sigma)	Syph % pos	46	42	51				40	50	
	- " % ?	1,2	0,6	1				11	12,5	
	Cont % pos	0	0	0				0,3	0	
	- " % ?	1,8	0	1,2				0	4,7	
MTR	Syph % pos		51	49	47	54	46			
	- " % ?		4,7	3,7	9,9	4,8	5,6			
	Cont % pos		0	2,1	1,3	1,3	1,0			
	- " % ?		0,5	2,4	2,3	1,7	1,7			

At the conference the following conclusions were approved:

I. BORDET-WASSERMANN TEST

(a) With Inactivated Serum.

Positive results: The Bordet-Wassermann test yielded in this Conference the uniformly greatest number of positive reactions in known cases of syphilis.

Specificity: With regard to specificity, no unspecific results whatever were obtained by certain of the investigators and, on

the whole, results which were possibly unspecific occurred very rarely.

Extracts: The results obtained by those workers who employed several extracts were not better than those using one only. It is concluded that the preparations of the extracts and the determination of the precise dose of complement to be used are of at least as great importance as the use of multiple extracts. The best results were obtained with heart extracts.

(b) **With Active Serum** (technique employed in the Pasteur Institute in Paris).

Positive results: The reaction yielded a higher number of positive results in known cases of syphilis than any of the methods used by the other workers.

Specificity: At the same time, the suspicion is raised that a larger number of unspecific results are obtained by this than by the other methods.

These conclusions need confirmation and further investigation especially with sera which have been withdrawn some time before test.

II. FLOCCULATION TESTS.

1. Comparison of Results of Flocculation Tests With Those Obtained by the Bordet-Wassermann Test.

The work of the Conference has shown that:

The Flocculation tests cannot at present replace the Bordet-Wassermann test. It must, however, be emphasized that, in the course of the present Conference, they have yielded positive results on a certain number of cases of syphilis in which the Bordet-Wassermann reaction was negative, although the latter test showed itself on the whole to be more sensitive.

It is therefore recommended that the Bordet-Wassermann test and the Flocculation tests be carried out side by side, since by such a combination the best results have been obtained.

2. Comparison of the Several Flocculation Tests.

(a) *Meinicke's D.M.*

According to the results of the various investigators both before and during the Copenhagen Conference, the D. M. with very few exceptions showed specific results. They were, however, for the most part on the weak side. The weaker results were more marked at the Conference work than in the previous tests.

Further consideration of the D. M. test can now be omitted since the author himself has replaced it by his "Trübungsreaktion," the extract for which is a modification of that used in the D. M.

(b) and (c) *Sachs-Georgi Test and Sigma Test.*

As to the other Flocculation tests which might be useful for routine purposes, the original reaction of Sachs-Georgi has yielded during this Conference more positive results in known cases of syphilis than the Sigma method. But conformably with this greater sensitiveness, its specificity was found to be slightly impaired. Since, however, these findings do not agree with those which have been obtained in certain laboratories, it is advisable to make further investigation in order to discover which of these two recommendable methods gives the better results.

(d) *Meinicke Trübungsreaktion (M. T. R.)*

Compared with the Sachs-Georgi Reaktion, the M. T. R. carried out with 3% saline yielded corresponding results, both as regards specificity and sensitiveness in cases of known syphilis. Both reactions proved somewhat less sensitive than the Bordet-Wassermann test. On the other hand, the Meinicke Trübungsreaktion, like the Sachs-Georgi and the Sigma reaction, yielded in a small number of cases of syphilis more positive results than the Bordet-Wassermann reaction. It is therefore advisable to carry out the M. T. R. in conjunction with the Bordet-Wassermann and the flocculation reactions considered above, particularly so because of the simplicity of this method.

Thus the hope of some investigators, that the flocculation methods might replace the Bordet-Wassermann test, was disap-

pointed. As regards the Sigma reaction this created considerable surprise, as some of the members of the Conference had already had opportunity to determine the absolute superiority of this test over the Wassermann method used by them. For that reason my assistant, *I. R. Mørch*, tried to clear up what could be the cause, especially by examining to what degree the Sigma test is dependent upon various small details. He found in fact that this was the case *p. ex.*:

Various specimens of *cholesterins*, even from the same makers, are not identical with regard to their ability to strengthen the S. R.

Inactivation of sera for the S. R. in tubes *closed* with rubber or cork or sealed in the flame may sometimes bring about some weakening of the reaction. In the case of the S.-G. R. this could not be established.

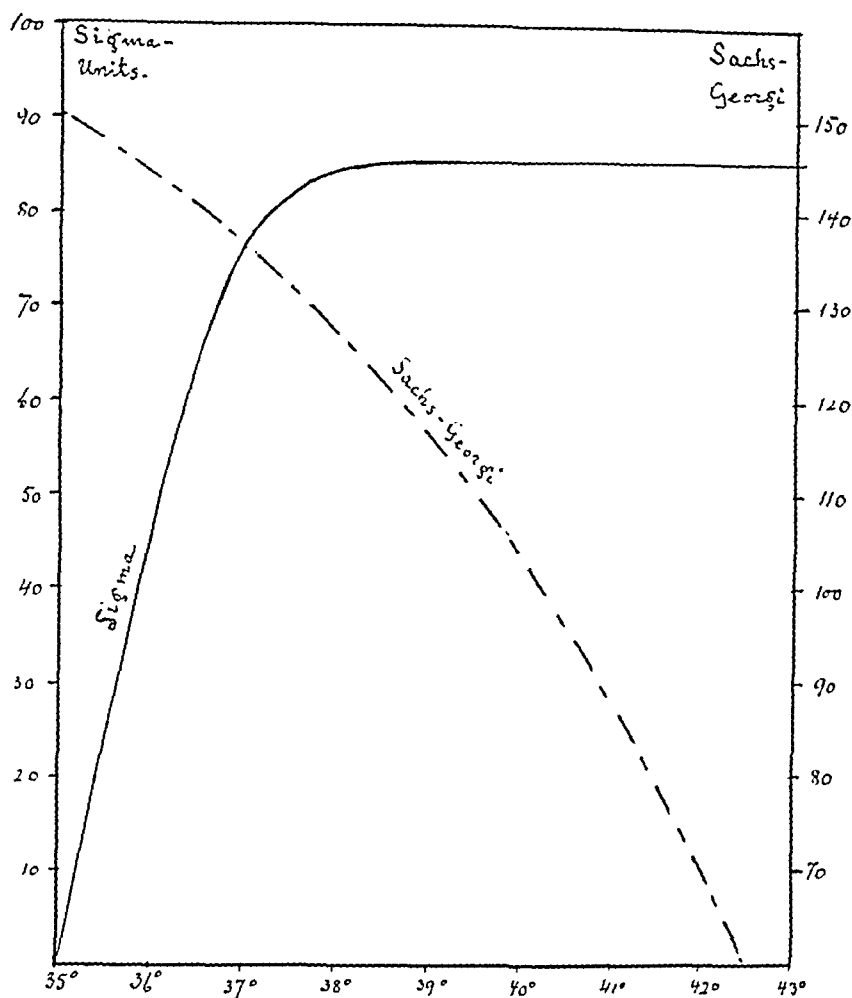
Even slight variations in the *temperature* at which *inactivation* is carried out will influence the strength of both the S. R. and the S.-G. R. The rate of the weakening of the strength of the serum is greatly increased for every degree that the temperature is raised above 54° C.

When the S. R. is carried out in a *closed* water bath, a much weaker reaction is obtained than when an open water bath is used.

It is of the greatest importance that the adjustment of the *water-level* in the water-bath should be exactly adhered to.

A number of different factors can give rise to the formation of inhibition zones.

It has not hitherto been realised that fluctuations in the *temperature*, at which the *Sigma* and the *Sachs-Georgi* tests are made, have a very great influence. This appears from fig. 2, which indicates the changes of these two sets with temperatures between 35° and 43° C. The titer of the Sigma reaction increases rapidly between 35° and 37° but it is only very slightly affected by temperatures above 38°. In contrast to the Sigma reaction the Sachs-Georgi reaction goes well at 35°; if the temperature is raised this causes a considerable decrease in the strength of the reaction, and this grows with increasing rapidity with every degree by which the temperature rises.



The Sigma reaction and the Sachs-Georgi reaction are thus both influenced by fluctuation in the temperature, but in diametrically opposite directions, as it is clearly shown by the graph.

If I have dwelt rather long upon a survey of these details in some flocculation reactions, it is not because I imagine those present have very much interest in the technical details, but because they show how difficult these methods are to work with, and how sensitive they are to all kinds of factors, even those

which, beforehand, one had not expected to be so. One is often inclined to regard these flocculation methods as being particularly simple, and in that see an advantage over the complement fixation methods. Even if the reaction thus comprises fewer factors and it is very much less expensive than the others, it is a mistake to think that it is a method that anyone can carry out. On the contrary. These methods ought to be placed solely in the hands of persons who know what they are dealing with and who have the necessary chemical and physical training.

These methods should also be carried out under the constant control of the clinician, that is to say, only where the diagnosing station is in close touch with clinics and hospitals, so that he can be warned if divergences should arise. Accordingly, the following resolution was adopted at the Copenhagen Conference:

“The several methods for the serological diagnosis of syphilis should only be carried out in laboratories specially adapted to the purpose and by experienced workers, as it has been shown that, even under the favourable conditions of the Conference, individual investigators exceptionally obtained incorrect results with one or the other method. Such results were only recognisable through the great number of controls and render it strongly advisable continually to employ numerous control sera. As, however, the final verdict in regard to serological methods is based on clinical investigation, it is to be emphasised that pathologists who are concerned in such investigations should work in collaboration with the clinician.”

In conclusion I will bring to your notice the procedure which was established by the Copenhagen Conference. This is the first time an attempt has been made to establish a really working conference, to gather the most competent people together to work on the same material. Apart from the personal significance such a gathering has for those attending, it almost seems to be the only means by which a comparison can be had between various, subtle methods as the serological reactions. Experience from this Conference seems to confirm this. Alone the explanation of such an apparent trifle as that *most* of the agglutinoscopes used were had for reading, explains several divergences

in the Sachs-Georgi reaction. The same thing applies to a large number of small technical details which are difficult to describe, even in a careful instruction. Such a Conference, where the work of course easily becomes forced, is not particularly suitable for really theoretical investigations, but a lot of experience can be gained and impulses received which become the starting point for scientific research.

But a lot of time is wasted by the fact that here and there in the many laboratories which occupy themselves with serodiagnosis of syphilis, a great amount of labour is spent on investigating and comparing all the new methods which from time to time appear. A greater part of this work of control is doubtless without great value. On the other hand the medical world, of course, has the right to know which of the existing and the new methods are to be preferred. Therefore it is important that a number of large, well-equipped institutes, with the necessary touch with the clinician, keep on taking these methods up for critical examination and, while doing so, keep in contact with each other. It is an attempt to create such an organisation that the League of Nation's Health Committee has made, and I hope that investigators from the United States will join in this team work.

PUBLIC HEALTH COMMITTEE

THE NURSING SITUATION

One of the important phases of the nursing situation, insofar at least as New York City is concerned, is the shortage of properly qualified nurses for bedside duty. The roots of this shortage touch every phase of the nursing problem. A large proportion of the graduates of nursing schools do not want to do private duty nursing and instead take up work in the fields of public health, industrial medicine, administration and education. Positions in these fields offer regular employment, a definite income, shorter hours of work as well as opportunity for advancement. There are other causes for the shortage of bedside nurses, one of which is the employment of trained nurses when the condition of the patient does not warrant the full-time service of a

nurse, or for chronic invalids where a trained attendant would do as well.

The difficulties which some hospitals experience in getting an adequate supply of pupil nurses as well as graduate nurses are often laid at the door of the State Department of Education. It has been repeatedly stated that the exactions of the Department with regard to the curriculum of the training schools are too severe. Some believe that the course of training could be made much simpler than it is at the present time, and that the provision of the law concerning the entrance requirement of one year high school education should be changed, permitting women with grammar school education to enter training schools. The wisdom of this is questioned by many on various grounds.

The State Department of Education is likewise often criticized for the ruling, which makes it impossible for a graduate nurse of another state to take a licensing examination in New York, if her school was not on the approved list of the New York State Department of Education at the time of her graduation. The Department is furthermore criticized for insisting that the graduate nurses in a hospital with a training school must be licensed in New York State, thus making the requirements with regard to nurses stricter than in the case of interns.

As a result of the shortage of nurses in New York City, a great deal of domiciliary nursing is done by women who are not graduates of recognized training schools and who are not required to be licensed in order to nurse the sick for compensation. The commercial registries for nurses have a large number of such women on their rolls. These women frequently exact the same compensation as graduate nurses, and in many instances the family of the patient does not know anything about the qualifications of the nurse whom they engage. The cost of nursing care is a matter of serious concern to people of moderate means.

The law of this State recognizes the so-called trained attendant. Her preliminary education is specified as that of a grammar school, and her training period is of nine months' duration, including six months of practical experience. For various reasons, very few institutions have availed themselves of this opportunity to train attendants.

The State also recognizes the graduates of state hospitals for the insane, who are called "trained nurses." Pointing to this precedent established by the present Nursing Act, the tuberculosis sanatoria are anxious to receive similar recognition for the graduates of their schools, who are practically the only type of nurse willing and with the necessary experience to nurse the tuberculous sick.

The nursing situation calls for a statesmanlike handling of the numerous aspects which it presents. The interests of the sick and of the community, the economic interests of the nurses, the interests of the physicians in securing the proper bedside care for their patients, and of the interests of public health and of the hospitals, as well as those of nurse training must be considered, and ways and means found for an adequate solution of this problem. The basic requirement is the possession of full and accurate data bearing on the subject.

The Public Health Committee has been interested for many years in the nursing situation and has from time to time offered suggestions and recommendations. During the last few months several conferences were held with interested groups, with a view of thrashing out the situation and arriving at the fundamental facts relating to the problem.

E. H. L-C.

HOSACK HALL AND THE HOSACK HOSPITAL BED FOR SICK AND NEEDY PHYSICIANS

The auditorium or principal assembly room of the Academy in which the stated and other large or general meetings are held, was provided for in the will of Celine B. Hosack, widow of Alexander E. Hosack. In the new building of the Academy the auditorium also will be known as Hosack Hall. The terms of the bequest are as follows:

"I do give, devise and bequeath unto the Society or Corporation known as 'The New York Academy of Medicine' the sum of Seventy Thousand Dollars, payable within one year after my decease, which it is my will and desire shall be devoted or applied by the Board of Trustees of the said Society or Corporation to the purchase or erection of a library building or lecture

room, or some other useful and suitable building adapted to the purposes of the said Society, which in memory of my dear husband Alexander E. Hosack shall in some appropriate manner be designed with and known by his name forever.

“If the said sum of Seventy Thousand Dollars shall be insufficient to defray the entire expense of constructing the whole of any building to the erection of which the Board of Trustees of the said Society may deem it proper to apply the money, then it shall either be allowed to accumulate at interest until the amount shall be sufficient for the purpose or it may be used and applied to the construction of any separate part of the building or any particular room or suite of rooms or any wing or addition to any building belonging to the Society and devoted to the objects for which the said Society was incorporated which can be separately distinguished from the other parts of the same building so as to be dedicated and designated in some suitable manner as a monument in memory of my husband.”

The last will and testament of Mrs. Hosack also provided for the procuring, furnishing and keeping in perpetuity of one free bed in the Roosevelt Hospital, to be known as the “Hosack Bed.” The conditions are that the bed shall be “occupied from time to time by such sick and needy physicians as may for that purpose be named or designated by President and Treasurer for the time being of The New York Academy of Medicine.”

This provision in the will was carried out in 1887.

PORTRAITS OF PHYSICIANS

The collection of portraits of physicians presented to the Academy by Dr. Charles L. Dana has recently been considerably augmented, as on May 27 Dr. Dana added the following portraits to the collection :

Govard Bidloo (engraving)	Erasmus Darwin (engraving)
Joseph Black (engraving)	George Fordyce (mezzotint)
J. F. Blumenbach (engraving)	Claudius Galen (mezzotint)
Hermann Boerhaave (mezzotint)	Theophile de Garencières (engraving)
Ephraim Bonus (engraving)	Samuel Garth (engraving)
William Cowper (mezzotint)	Johann Georg Gmelin (mezzotint)
Thomas Browne (engraving)	

Robert Glynn (engraving)	Johann Albert Heinrich Reimar (mezzotint)
Johannes Heins (engraving)	Moritz Heinrich Romberg (engraving)
Nathaniel Highmore (engraving)	Antonio Scarpa (engraving)
Edward Jenner (engraving)	Nicholas Tulp (engraving)
Nicolas Abraham de La Framboisière (engraving)	Bernhardus Verzascha (engraving)
Richard Mead (engraving)	Rudolf Virchow (photogravure)
Henry Moyes (mezzotint)	John Wasdale (colored mezzotint)
Ph. Th. A. Paracelsus (engraving)	Sir Thomas Watson (mezzotint)
Ambroise Paré (engraving)	James R. Wood (lithograph)
John Patch (engraving)	
Ernst Platner (engraving)	
Francois Rabelais (engraving, 3) (col. pr., 2) (mezzotint)	

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DEATHS OF FELLOWS OF THE ACADEMY

JOHN ADDISON FORDYCE, A.B., A.M., M.D., Ph.D.

Professor John Addison Fordyce, eminent American dermatologist and syphilologist, died June 4, 1925, two weeks subsequent to an appendectomy, in his 67th year.

Dr. Fordyce was born in Ohio on February 16, 1858. His father, John Fordyce, was born in Pennsylvania, of Scotch ancestors, but he spent most of his life in Ohio where he engaged in extensive business enterprises. His mother, Mary A. Houseman Fordyce, was born in Pennsylvania, of German ancestors. Dr. Fordyce is survived by Mrs. Fordyce, *née* Alice Dean Smith, of New York City, whom he married in 1886, and by their son, Dr. Addison Fordyce, and their daughter, Emma Fordyce Swift, wife of Dr. Homer Swift, of the Rockefeller Institute.

After receiving a common school education, John Addison Fordyce entered Adrian College, Adrian, Mich., where he received the degree of A.B. in 1878, that of A.M. in 1889, and the honorary Ph.D. in 1901. He graduated from the Northwestern University Medical College in 1881, immediately after which he served as intern in the Cook County Hospital (Chicago) until 1883. From this date until 1886 he resided in Hot Springs, Ark., during which time he practiced general medicine and devoted special attention to surgery. The next three years (1886 to 1888, inclusive) were spent in Vienna, Berlin and Paris, studying dermatology, pathology and bacteriology under such masters as Koch, Lassar, Behrend, Kaposi, Fournier, Besnier, Vidal, etc. The degree of M.D. was received from the University of Berlin in 1888.

Dr. Fordyce returned to New York City in 1888, where he at once began the practice of dermatology and genito-urinary diseases. Education, training, common sense, vision, perseverance, unusual ability, hard work, and personality permitted Dr. Fordyce to very quickly rise to the top of his chosen field in this country, and it was not long before he acquired an international reputation. He was Instructor and Lecturer in Dermatology at the New York Polyclinic from 1889 to 1893. In 1889 he became associated with Prince Albert Morrow as Editor of the Journal of Cutaneous and Genito-Urinary Diseases. This association was terminated in 1892, after which he was sole Editor for a few years, when James C. Johnston became Associate Editor. He resigned as Editor in 1897, but continued to serve on an Editorial Board (Journal of Cutaneous Diseases and Syphilis) until a very few years ago.

In 1893 Dr. Fordyce was appointed Professor of Dermatology in the Bellevue Hospital Medical College. He received the Chair of Dermatology and Syphilology in the New York University and Bellevue Hospital Medical College in 1898, from which position he resigned in 1912 to accept the Chair of Dermatology and Syphilology at the College of Physicians and Surgeons, Columbia University, which position he held until his death.

Dr. Fordyce was Visiting Dermatologist to the City Hospital from 1893 until 1925. He was Consulting Dermatologist to the Presbyterian Hospital, Fifth Avenue Hospital, Woman's Hospital, New York Infirmary for Women and Children, and the Neurological Institute. He was Secretary of the American Association of Genito-Urinary Surgeons from 1889 to 1892; President of the American Dermatological Association in 1899; Chairman of the Dermatological Section of the American Medical Association in 1903; Secretary-General of the Sixth International Congress of Dermatology in 1907; President of the New York Dermatological Society; Chairman of the Dermatological Section of the New York Academy of Medicine, etc. At the time of his death he was an active member of all the important dermatological societies of this country. He was an honorary member of the Italian, German and English dermatological societies, and corresponding member of the French and Danish dermatological societies. He was an associate member of the Association for Cancer Research, etc.

Dr. Fordyce was a prolific writer of invaluable articles in his chosen field, his literary contributions numbering well over one hundred, to all of which he gave much skill, time, research and money.

That he was a great teacher is shown by the large number of eminent dermatologists who were trained by him. His organizing ability was demonstrated by the evolution of the largest and best conducted clinic in this country.

In spite of his age, Dr. Fordyce was as professionally active and as thoroughly modern during the last year of his life as at any previous time. He was a cultured man, a gracious host, an inordinate worker, kind, human, tolerant and fair. His clean life, his achievements and his personality caused him to be an inspiration to the younger men. He was loved and respected by his colleagues, friends, contemporaries and subordinates. It was an honor to be associated with him in any capacity. American dermatology has suffered a terrible loss in the death of John Addison Fordyce.

GEORGE MILLER MACKEE

William Burwell Trimble, 80 West 40th Street, New York City; born in Montgomery, Alabama, September 27, 1870; graduated in medicine from New York University in 1891; elected a Fellow of the Academy April 7, 1904; died May 23, 1925. Dr. Trimble was Professor of Dermatology and Syphilology in New York University Medical College; a Fellow of the American Medical Association; member of the American Dermatological Society; member of the New York Dermatological Society; and Director of Dermatology and Syphilology of Bellevue Hospital.

Henry Morton Pierson, Roselle, New Jersey; born in Roselle, N. J., December 30, 1878; graduated in medicine from the College of Physicians and Surgeons, Columbia University, New York, in 1903; elected a Fellow of the Academy March 2, 1911; died May 6, 1925.

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BULLETIN
OF
THE NEW YORK
ACADEMY OF MEDICINE

INSTITUTED 1847

SECOND SERIES, VOL. 1, No. 2



APRIL, 1925

PUBLISHED MONTHLY BY
THE NEW YORK ACADEMY OF MEDICINE
LANCASTER, PA. NEW YORK
Lime & Green Sts. 17 W. 43d St.

1925

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John W. Francis.

THE NEW YORK ACADEMY OF MEDICINE

VOL. 1

APRIL, 1925

No. 2

JOHN WAKEFIELD FRANCIS (1789-1861)

PRESIDENT OF THE NEW YORK ACADEMY OF MEDICINE (1847-1849)

Of the remarkable group of men who constitute the fine flower of medical New York in the early period, such men as the Bards, John Jones, Wright Post, the elder Hosack, Mitchill, Stearns, Mott, Beck, Alonzo Clark, Willard Parker, Frank H. Hamilton, S. S. Purple, Fisher, and Jacobi, there were none more picturesque than John W. Francis, principal founder and second president of the Academy of Medicine; a sturdy, stocky, benevolent figure of a man, who prided himself on his resemblance to Benjamin Franklin, and who to the last, wore the old-fashioned raiment of Knickerbocker days.

Some ten years ago, Dr. Osler pressed me to write about Francis. I found that his position in the mere general history of medicine could be stated in three lines; for he contributed nothing to scientific medicine and his reputation as a teacher and practitioner was civic and local, an effect of personality. But as a personage he was very remarkable and filled the public eye for half a century. A physician of essentially literary type, he was, in effect the leading practitioner of New York in his day, a kind of medical Mæcenas, at whose house all the visiting celebrities of Europe and America congregated. He inherited his practice in a kind of apostolic succession from Samuel Bard through David Hosack, and was eulogized after his death by Valentine Mott and others in terms that, to-day, seem almost extravagant.

He was born in New York City on November 17, 1789; his mother a Philadelphian of Swiss extraction, his father an immigrant from Nuremberg, a local grocer who, dying of yellow fever

in 1795, left his widow well enough off to educate her son. In the old days, these ethnic associations counted for much, and something of the pleasant Thuringian past hovers about the memory of Francis. Literary aspirations led him to apprentice himself to George Long, a noted publisher of the period, but it was noticed that the boy neglected his dinner to munch an apple under a printing press in pursuit of Latin grammar, and the indentures were soon cancelled by the master. After the usual schooling and private tuition, Francis graduated at Columbia at the age of 20. Two years before he had entered the office of David Hosack. In 1811, when he took his M.D. at the College of Physicians and Surgeons as its first graduate, he was immediately taken into partnership by Hosack, who regarded his junior as the best consultant he had ever known. In 1813, the Medical Department of Columbia College (formerly King's College, founded 1767) was discontinued to fuse with the College of Physicians and Surgeons (founded 1807).

Hosack held the chair of practice, Mott that of surgery, Francis that of materia medica, subsequently, like Nathan Smith, "holding down" other chairs, *viz.*, institutes of medicine, medical jurisprudence and obstetrics. During a visit to Europe, Francis met Byron, Sir Walter Scott, Abernethy, John Bell, Cuvier, Dupuytren, Arago and Geoffroy de St. Hilaire. Abernethy was so taken with him that he invited him to settle in London. Francis was so taken with Abernethy that he copied the eccentric surgeon's dress and offhand traits of speech and manner, "conversational habits" which, we are told, "it cost him, in after years, trouble to discard." In 1826, the whole faculty of the College of Physicians and Surgeons, Francis included, resigned in a body, to join the newly founded Rutgers Medical College. This institution ran under a New Jersey charter although located in New York State. Five years later, legislative enactment closed its doors, and for the next thirty years, Francis devoted himself entirely to medical practice. He had been highly popular as a teacher, but, in the early days, had to eke out his living by writing articles on "Benjamin Rush" and "New York" for Rees' Encyclopaedia, and editing books and journals, of which Denman's Midwifery (1825), gave him considerable kudos and

emolument. By 1820, he was making \$15,000 a year. He was essentially charitable and public spirited; his carriage was seen as often in the slums as in Bleecker Street, and his donations to the Historical Society alone amounted to \$8,000. When Dewees was dangerously ill, Francis sent a messenger to Philadelphia at his own expense to ascertain his condition. Two pictures in Mott's narrative give us the man. One is that of Francis, bare-headed, following the coffin of a little child (which he had charitably paid for) in an obscure part of the city. The other is the immense gathering of rich and poor alike at his own funeral in the aisles of St. Thomas. "He was," says Mott, "in a very eminent degree, the physician of the poor." His last days were racked by insomnia, gigantic carbuncles, multiple abscesses and spreading aphthae in the throat. His wife, a first class home-maker, looked after his practice, staved off night calls, and kept bores, parasites and promoters at a distance. In the matter of keeping open house, Francis was a kind of Osler. His home at No. 1 Bond Street was frequented in turn by DeWitt Clinton and Daniel Webster, Washington Irving and Fenimore Cooper, Frenea and Bryant, Edmund Kean, George Frederick Cooke and Macready. Astonishing is the number of books, poems, keepsakes and even sheet music dedicated to Francis in his lifetime. Whatever of trash is to be found the catalogue of his library is an index of his innate kindness of heart. He could not resist a book-agent or a canvasser for some pretentious serial publication.

The medical and literary reputation of Francis in our day, attaches to two works: the *American Medical and Philosophical Register* (1810-14), an important periodical which he edited with Hosack, and his anniversary discourse before the New York Historical Society (1857), subsequently reprinted as "Old New York" (1858). The first is a valuable repository of medical cases and biographies of prominent physicians, with hundreds of editorials on all aspects of American life in the period. It contains Francis' case of acute septic peritonitis due to strangulation of the ileum by a Meckel diverticulum complicated by appendicitis, illustrated by a remarkable woodcut. The second is a vivid and readable picture of New York in the first half of

the nineteenth century. Before he died, Francis had been urged to write his autobiography. On his death bed, he said to Mott, "If it had been God's will, I should have been pleased to live a little longer: I should have been satisfied to sit in the chimney corner and write." He wrote countless other things, a collection of pathological cases (1814), on febrile contagion (1816), on cholera (1832), on the mineral waters of Avon (1834), on the anatomy of drunkenness (1841), but nothing quite so good as this book. It contains his often cribbed biography of Mitchill, an extraordinary gallery of old New York clergymen of all denominations, another gallery of contemporary actors and singers, and cultural pictures of all kinds.

Edith Wharton, in "False Dawn" has given a piquant burlesque of the florid, pompous, ponderous, prolix manner of writing and speaking which prevailed in those early days. Alfred Henry Lewis has given us a very liberal dose of it in his novel about Andrew Jackson and Peggy O'Neill. Oliver Wendell Holmes defined it as "chewing the juice out of all the superlatives in the language in Fourth of July orations." Henry James, in "Crapy Cornelia," signalized the later American tendency, to ridicule whatever is not up-to-date and "in the know." The literary manner of Francis combines the two traits. In public speaking, clad in well-fitting but old fashioned clothes, with white neck cloth, he affected the old Abernethian straight-from-the-shoulder manner, "a mountain torrent," "not easy or graceful," Mott says, "convincing if not always persuasive." His literary manner, on the other hand, is often an exaggerated type of that "genteel style of writing" of which Cadogan is the exquisite example in the medical literature of the eighteenth century. The torrent of superlatives would amount to a veritable "geyser of buttermilk," were it not for the deft satiric touch which, in historic retrospect, is plainly the Manhattan or Metropolitan note. As examples of the lapidary, eighteenth century manner: when Francis wants to say that Dr. Mitchill knew many languages and read science extensively, he does it in the funereal manner of Sir Thomas Browne: "Ancient and modern languages were unlocked to him, and a wide range in physical science the pabulum of his intellectual repast." The

complexities of Samuel Parr's wig become "its distensive and seemingly patulous gyrations." Of the sedative effect of the stage on the tired business man, he says: "It proves a wondrous relief to the laborious man and the worn intellect, and is a happy succedaneum for diversions less beneficial to good morals and good health." Chemistry becomes "that science which seems to inosculate with almost every other." And in describing De Witt Clinton's obesity, not content with his own ponderous Johnsonian periods, Francis cites Johnson himself: "an aggravated agglomeration of superabundant redundances." Were this all, our author would be frankly a bore. But read his "Old New York" and you will discover that so excellent is his practical common sense and so striking his wealth of real facts that the florid verbiage is usually humorous in intention. Thus, "Volney's portly form gave outward tokens of his tremendous gastric powers." One clergyman is "a diminutive creature," another "had the bearing of a well-stalled bishop." Old McGrath is "a violent Scotchman" of "captious disposition and unrefined address." Of Mitchill's childlessness, we read: "Like most of our sex, he was married; but, as Old Fuller would say, the only issues of his body were the products of his brain." All admirers of Henry James and Edith Wharton will be reminded here of those demure touches of social satire in which these writers (native New Yorkers both) excel. Francis' book is an essay toward a cultural history of Knickerbocker New York *en profil*. The experienced reader will derive considerable stimulus from the flowing narrative as it dilates successively on the old landmarks, the historic trees, residences, gardens and parks, the faculty and graduates of Columbia College, the clergy, the judiciary, the physicians, the early schools and schoolbooks, the stage, the opera, the painters and sculptors, the clubs, the hospitals, the Academy of Medicine, the Historical Society, the newspapers and magazines and their editors, the native literature, the period, the publishers, the Methodist Book Concern, second only, at that time, to Harper Brothers, and such celebrities as Robert Fulton, Thomas Paine, Edmund Kean and Macready. The musical and dramatic critics have passed him by, but Francis gives page after page about the early actors, about Manuel Garcia (of laryngo-

scope fame) and his daughter Malibran, and about Lorenzo Da Ponte, librettist of *Don Giovanni* and *The Marriage of Figaro*. Why, one may ask, has such a worthwhile book been forgotten? The answer is that Francis died on February 8, 1861, just before the Civil War, and the stirring events that followed obliterated his memory except in the minds and hearts of those who, like Jacobi, knew him in the flesh. "Dr. Francis," says his biographer, Gardner, "was essentially a representative man. Many looked upon him as a type of the Knickerbocker settlers of New Amsterdam, with whom it is seen he had no affinity; yet still his short, thick-set frame, which weighed about one hundred and ninety pounds, his straight-bodied coat and vest, his white neckerchief, broad-brimmed hat, inseparable cane and gold spectacles, made a unity in look which fancy associates with the early Dutch settlers." If I may revive some interest in the man and his writings, this sketch will not have been written in vain.

F. H. GARRISON.

MODERN COLLOID CHEMISTRY

BY ARTHUR W. THOMAS, PH.D.

(Delivered before the New York Academy of Medicine, February 5, 1925)

Colloids, first classified and named by Thomas Graham (1861); have been considered as a separate and distinct kind of matter, due in part to a misinterpretation of Graham's definition of them. The present trend in the field of colloid chemistry is to regard colloids as individuals or aggregates which when dispersed in a solvent are amenable to the laws governing the conduct of the other state of matter, named "crystalloidal" by Graham for purposes of distinction.

Before discussing the modern trend in colloid chemistry, it would perhaps be helpful to review very briefly the older conception of colloids and colloidal solutions.

Since an irregular translatory and rotational movement (Brownian Movement) was seen in suspensions of particles less than 4 microns ($1\mu = 0.001$ millimeter) in diameter, and

due to the fact that suspended particles were found to migrate in an electrical field, it was believed that colloidal particles remained in solution or suspension by virtue of the Brownian Movement and the repulsive forces arising from the fact that they were electrically charged. In other words, colloidal suspensions were considered to be like clouds.

Colloidal solutions were also considered to be different from ordinary solutions (called "true" solutions as a means of distinction), such as of sodium chloride or cane sugar, in that the colloidal particles could not diffuse through a membrane of parchment paper which was freely permeable to the crystalloids, such as salt or cane sugar. Hence colloidal solutions are generally defined as dispersed systems in which the dispersed phase does not pass through semi-permeable membranes such as parchment, collodion and gut.

Another overworked criterion of colloidity is the optical heterogeneity observed in the ultra microscope.*

Colloidal solutions have also been defined on the basis of the size of the dispersed particles. This has been quite arbitrarily set at larger than 1 millimicron ($1\ \mu =$ one-millionth of a millimeter) and smaller than 100 or 200 millimicrons. The upper limit is the limit of the resolving power of the best compound microscope using blue light. This was set at 200 millimicrons by Stoney.¹ The lower limit has no such alibi. It appears to have been adopted from a statement made by Zsigmondy about twenty-five years ago.

In closing this review of the older (and in some circles, the present) ideas concerning colloids, the amorphous appearance of colloids should be mentioned. It is widely believed that there are two worlds of matter, amorphous and crystalline, due to Graham's statement that his colloids were all amorphous. The fact that the substances arrested by the parchment membrane, and which diffused exceedingly slowly through a column of water were amorphous, while those which passed freely through the membrane and diffused readily through water were crystal-

* An ultra microscope is actually just a microscope with orthogonal ultra-illumination.

¹ Stoney: J. Roy. Microscop. Soc. (1903), 564.

line, impressed him so much that he coined the terms *colloid* (glue-like) and *crystalloid*. But he did not mean to imply that colloids were always amorphous as the following quotation² will prove—"A similar departure from its normal condition appears to be presented by a colloid holding so high a place in its class as albumen," "In the so-called blood-crystals of Funke, a soft and gelatinous albuminoid body is seen to assume a crystalline contour," "Can any facts more strikingly illustrate the maxim that in nature there are no abrupt transitions, and that distinctions of class are never absolute?"

Anything that appears amorphous is called colloidal as a result of Graham's classification, but many colloids have since been shown to be crystalline. Some proteins may be crystallized and the Debye-Scherrer X-ray method³ has shown that amorphous looking precipitates consist of amicroscopic crystals.

There are many substances which may exist in solution as "crystalloids" or as "colloids" dependent upon conditions. Colloidal refers, therefore, to a *state* or *condition* of matter, and not to a kind of matter.

The optical heterogeneity observed in the slit ultra microscope, or by use of any of the dark-field illuminators employed in bacteriological technique, is quite commonly believed to be a universal property of colloidal solutions. All colloidal solutions do not show it however, at least with the well known slit ultra microscope or dark-field illuminators using electric arc illumination. The intensity of the diffraction or scattering of light by small particles is a function of several factors as shown in the following expressions,⁴

$$I = K \frac{n v^2}{\lambda^4}$$

$$I = k \left(\frac{r_{dp}}{r_{dm}} - 1 \right)^2$$

² Thomas Graham: Phil. Trans. Roy. Soc. 151, 183 (1861).

³ Debye and Scherrer: Physikal. Zts. 17, 277 (1916). Scherrer: Nachr. König. Ges. Wiss. Göttingen (1918), 96.

⁴ Lord Rayleigh: Series of papers in Phil. Mag. from 1871 —.

where I = intensity of scattered light
 K = an indeterminate factor depending upon the refractive indices of liquid and dispersed phase, on the amplitude of incident rays and the angle at which the scattered light is observed
 n = number of particles in unit volume
 v = volume of particles
 λ = wave length of light
 r_{dp} = refractive index of dispersed phase
 r_{dm} = " " " " dispersion medium
 k = proportionality factor.

It is apparent that unless the indices of refraction of the dispersed phase and of the dispersion medium are quite different, the intensity of the scattered light (or Tyndall Effect) will be very small. This must be so in many colloidal solutions. Gelatin and albumin solutions when thoroughly freed of all foreign matter, and when at hydrogen ion concentrations removed from that of the isoelectric point are optically void in the usual type of ultra microscope. Hence the ultra microscope method is by no means an infallible test for colloidal-ity.*

The use of parchment paper and other semi-permeable membranes has likewise become a poor means of distinction between "colloids" and "crystalloids." The elimination of such membranes as an infallible apparatus for the sifting of "crystalloids" from "colloids" is due to the investigations of Wm. Brown.⁵ This investigator showed that semi-permeable membranes vary widely in permeability according to the method of preparation. For example, he prepared membranes which permitted sodium chloride to diffuse through, while arresting the dialysis of sodium chloride. Others were permeable to the colloids, starch and dextrin, while impermeable to the colloidal dye Night Blue, etc. A further interesting study of membranes for use in bacteriological technique has been made recently by Eggerth.⁶ The papers by Brown and by Eggerth

* It should be mentioned, however, that when using an exceedingly intense source of light, even chemically homogeneous liquids such as water or benzene scatter light. (Cf. Martin: *J. Phys. Chem.* 26, 75 (1922).)

⁵ Wm. Brown: *Biochem. J.* 9, 591 (1915), 11, 40 (1917).

⁶ A. H. Eggerth: *J. Biol. Chem.* 48, 203 (1921).

should be studied by all who may have occasion to use such membranes, in dialysis or ultrafiltration.

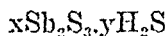
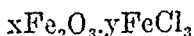
The Brownian Movement is an effect rather than a cause. It is merely the name applied to the visible manifestation of kinetic energy of the particles or of the molecules of the dispersion medium which are bombarding the particles.

It is natural that prior to the conception of the "Ionic Theory" the motion of colloidal particles in an electrical field was ascribed to electrical charges similar to those on the water particles in clouds. In a given colloidal dispersion all particles migrate in the same direction, consequently they bear the same sign of charge. Since like charged bodies repel each other, it was logical to ascribe the existence of a stable colloidal dispersion to the repulsions of like charged particles opposing the coalescing influence of gravitational and surface forces.

Smoluchowski⁷ points out that such charged suspensions would emit an electrical discharge, like lightning from a cloud, when grounded, as for example, by inserting one's finger into the colloidal solution.

There are many colloidal solutions in which the dispersed phase does not migrate in an electrical field. Examples are proteins at the isoelectric point, starches and dextrans. They are held in solution presumably by the same forces to which the solubilities of cane sugar and common salt are attributed.

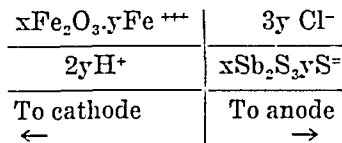
The origin of the solution forces and the reason for the electrical migration of colloidal dispersions of apparently insoluble substances such as ferric oxide, antimony sulfide, gold, etc., have gradually become apparent through years of research. It is now definitely known that these insoluble substances do not exist as such in colloidal solution. The particles in colloidal ferric oxide solution consist of a complex of Fe_2O_3 and a soluble iron salt such as FeCl_3 , antimony sulfide hydrosol consists of a combination between Sb_2S_3 and H_2S . Formulae may be roughly written for them (ignoring the hydrate water) as follows:



where x and y are variable and x is always greater than y . When an electrical current is passed through these solutions, a

⁷ Z. physikal. Chem. 92, 129 (1917).

brown precipitate of Fe_2O_3 settles out at the cathode and chlorine is evolved at the anode in the iron oxide hydrosol, while in the antimony sulfide sol, a red deposit of Sb_2S_3 is deposited at the anode and hydrogen gas is liberated at the cathode. This shows that the migrating ions are,—



The ionization is not complete; it is in fact slight and the migration is not quite so simple as indicated.⁸ But it is not possible to make fine distinctions in a short discussion.

The gradual realization of the fact that the "impurities," *e.g.*, the FeCl_3 or the H_2S , were essential parts of certain hydrosol particles gave rise to the so-called *Complex Theory*—a very simple statement of the complex nature of certain colloids.

While the Complex Theory was accepted for many colloidal dispersions, hydrosols of noble metals such as gold and platinum were thought to be exceptions, since it was believed that they could be prepared by electrically arcing these metals under pure water. This was disproven by Beans and Eastlack.⁹ They demonstrated that colloidal platinum could be formed in pure water due to the fact that platinum oxidizes in the arc, thus generating an electrolyte which became part of the dispersed phase. Gold was shown to require the presence of minute amounts of certain salts, in fact those which form stable chemical compounds of gold.

It is therefore not difficult to see the origin of the solubility forces, since insoluble substances in colloidal solution are actually a part of a complex aggregate containing a soluble component. Evidence for *solution* forces as the reason, or at least one of the reasons for colloid solution stability has been given by Thomas and Frieden.¹⁰ A simple experiment may be cited. Addition of alcohol followed by ether to a hydrosol of $x\text{Fe}_2\text{O}_3$.

⁸ See J. Duclaux: *J. Chimie physique* 7, 405 (1909).

⁹ Beans and Eastlack: *J. Am. Chem. Soc.* 37, 2667 (1915).

¹⁰ A. W. Thomas and A. Frieden: *J. Am. Chem. Soc.* 45, 2522 (1923).

$y\text{FeCl}_3$ did not affect it. Alcohol promptly precipitated a hydrosol of $x\text{Fe}_2\text{O}_3 \cdot y\text{Fe}_2(\text{SO}_4)_3$. Ferric sulfate is insoluble in alcohol.

When a solution of a salt, NaR (or RCl), where Na^+ (or Cl^-) is a diffusible ion and R^- (or R^+) represents a complex non-diffusible ion is placed in solution on one side of a membrane which separates it from an aqueous solution of an electrolyte such as HCl , NaOH , or NaCl , all ions of which are diffusible through the membrane, an unequal distribution of diffusible ions results on the two sides of the membrane. This is the Donnan effect.¹¹ The sum of the ions of one sign of charge on one side of the membrane will be greater than the sum of the same ions on the other when equilibrium is reached. This gives rise to a difference in potential across the membrane. J. A. Wilson¹² has postulated the existence of a similar orientation of the diffusible ions about a particle in colloidal dispersion. A difference of potential exists between the surface of the particle and the solution in which the particle is suspended. The addition of salts lowers this Donnan potential and at the same time causes the colloidal particles to coalesce and precipitate. Hence the Donnan effect must be considered as an added factor in colloidal stability. It does not apply to electrically neutral colloids such as dextrans where solution forces alone are responsible for the stability.

Magnificent proof of the validity of Donnan's theory, particularly as applied to proteins, has been provided by the late Jacques Loeb.¹³ The presentation of Dr. Loeb's point of view will be given by the next speaker.

Application of the method of osmotic pressure for the determination of the molecular weight of colloiddally dispersed particles has produced results indicating molecular weights of many thousands. This has been severely criticized by Bancroft¹⁴ who contends that such measurements and deductions are not applicable to heterogeneous systems. Many of the colloidal dispersions investigated by this method certainly show striking evidence of heterogeneity in the ultra microscope.

¹¹ F. G. Donnan: *Zeits. Elektrochemie* 15, 572 (1911).

¹² J. A. Wilson: *J. Am. Chem. Soc.* 38, 1982 (1916).

¹³ Loeb: *Proteins and the Theory of Colloidal Behavior*. McGraw-Hill Co., New York, 1925). (Second edition.)

¹⁴ W. D. Bancroft: *Applied Colloid Chemistry*, page 187. McGraw-Hill Co., New York, 1921.

At the present state of our knowledge of inorganic colloidal dispersions, it is futile to argue this question, while on the other hand, it would appear justifiable to regard certain hydrophilic dispersions as true solutions of large molecules, such as aqueous solutions of albumin, gelatin, Lintner's soluble starch, gum arabic, dextrin, etc.

Such solutions show easily measurable osmotic pressures. As a result, there are numerous published values for the molecular weights of colloids which form hydrophilic dispersions.

Osmotic measurements by W. Biltz¹⁵ and freezing points by Lintner and Düll¹⁶ show the following molecular weights for dextrans:

Achroödextrin	about	2,000
Erythrodextrin	"	3,000
Amylodextrin	"	20,000

Osmotic pressure measurements upon starch solutions by Samec¹⁷ indicate molecular weights of about 100,000.

Published values for molecular weights of many hydrophiles, which exist as compounds of a diffusible with a non-diffusible ion, are, however, of doubtful value in view of the facts developed by Donnan and verified by Loeb.

Osmotic pressure molecular weight determination has been successful with hemoglobin. This is not surprising since the isoelectric point of hemoglobin is practically at the neutral point, i.e., C_{H^+} of 10^{-7} moles per liter. Consequently purification of hemoglobin by dialysis in pure water solution should produce hemoglobin practically free from diffusible ions. By this method the hemoglobin of calves' blood showed a molecular weight of 16,300.¹⁸ It is interesting to compare this figure with those obtained by other methods. Hemoglobin contains iron (0.336 per cent.). Assuming that one atom of iron is contained in one molecule of hemoglobin, a molecular weight of 16,700 is obtained (the accepted value). One gram of calves' hemoglobin combines with 0.00167 gm. of carbon monoxide (Hüfner). Assuming

¹⁵ Z. physik. Chem. 83, 683 (1913).

¹⁶ Ber. 26, 2533 (1893), 28, 1522 (1895).

¹⁷ Samec and Hoeft: Kolloidchem. Beihefte 5, 195 (1913).

¹⁸ Hüfner and Gansser: Arch. (Anat. u.) Physiol. (1907) 209.

that one mole of hemoglobin combines with one mole of carbon monoxide, a molecular weight of 16,700 is obtained.

Assuming that the hemoglobin molecules are spherical in shape the radius may be calculated from the following formula to be equal to 1.8 millimicrons:

$$M = \frac{4}{3} \pi r^3 d N$$

where M = molecular weight

r = radius of molecules

d = density of hemoglobin molecules in solution (assumed to be a mean of the density of hemoglobin and of water)

N = Avogadro number, 60.6×10^{22} .

The molecular weight of egg albumin dissolved in an ammonium nitrate solution has been indicated to be about 34,000.¹⁹ The "Donnan" effect was allowed for in this measurement.

From its content of tryptophane, casein appears to have a molecular weight of 12,800. The equivalent combining weight²⁰ of casein for sodium hydroxide multiplied by 6 is 12,600, while the molecular weights obtained by multiplying the values obtained from the sulfur and phosphorus contents by 3 are 12,654 and 13,116, respectively. This is strong evidence that the molecular weight of casein is about 12,700, and that casein is a chemical individual amenable to the classical laws of chemistry, rather than a mysterious agglomerate endowed with the peculiar properties formerly ascribed to colloids.

Mutual Reactions of Colloids

When colloidal solutions are mixed, decrease in stability leading to precipitation may result, or if one of the components of the mixture is a very stable colloid (hydrophilic), and is added in excess while the other is rather unstable (hydrophobic), no visible change may take place and the solution will be found to show the stability and properties of the hydrophilic colloid.

The latter phenomenon is called "protective action." The former case, mutual precipitation of colloids, will be considered first.

¹⁹ Sørensen: *Z. physiol. Chem.* 106, 1 (1919).

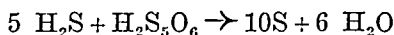
²⁰ Cohn and Hendry: *J. Gen. Physiol.* 5, 548 (1922-23).

The phenomenon of mutual precipitation of certain colloids was noted by Thomas Graham.²¹ Linder and Picton²² showed that mutually precipitating sols migrated oppositely in an electrical field. This was confirmed by others.

The theory of mutual precipitation, which arose from these findings and from the opinion that colloid stability resided in the mutual repulsion of like-charged particles, was that when oppositely charged colloidal particles are brought together an electrical neutralization ensues resulting in agglomeration of the particles; there being no electrical repulsive forces left, the particles must settle out of solution.

In 1910, Lottermoser²³ suggested that the equivalence may be that of the small amounts of stabilizing electrolyte in the sol, and that the precipitation may be due to a chemical reaction between the stabilizing agents. Experiments with silver iodide sols indicated that this chemical point of view was correct.

Freundlich and Nathansohn²⁴ have recently shown that the mixing of pairs of certain like-charged colloids may result in mutual precipitation. For example, they found that arsenic trisulfide hydrosol precipitates Odén's sulfur hydrosol, both of which migrate to the anode in an electrical field. Obviously, the electrical charge neutralization hypothesis fails in this instance. Since Odén's sulfur sol contains pentathionic acid as stabilizing agent (or is one of its stabilizing agents) and arsenious sulfide sol is stabilized by hydrogen sulfide, it was deduced that the mutual precipitation of these sols is a result of the following chemical reaction between their stabilizing agents:



Recently a careful quantitative study of mutual precipitation of ferric oxide hydrosol by silica hydrosol has been reported by Thomas and Johnson.²⁵ This paper offers strong evidence to the effect that mutual precipitation of certain hydrosols is the result of chemical reaction between the ions of the respective stabiliz-

²¹ Thomas Graham: *J. Chem. Soc.* 15, 246 (1862).

²² Linder and Picton: *J. Chem. Soc.* 71, 586 (1897).

²³ Lottermoser: *Kolloid Z.* 6, 78 (1910).

²⁴ Freundlich and Nathansohn: *Kolloid Z.* 28, 258 (1920); 29, 16 (1921).

²⁵ Thomas and Johnson: *J. Am. Chem. Soc.* 45, 2532 (1923).

ing electrolytes present, to which, in accordance with the "Complex Theory" of colloids, certain colloids owe their stability or solubility forces.

In an extensive series of experiments in which various ferric oxide hydrosols ($x\text{Fe}_2\text{O}_3.y\text{FeCl}_3$) were used to precipitate a wide variety of silica sols ($x\text{SiO}_2.y\text{SiO}_3\text{Na}_2$) it was found that the "positive colloid," ferric oxide precipitates the "negative colloid" silica due to chemical reaction between the ferric chloride (or its HCl of hydrolysis) and the sodium silicate (or its NaOH of hydrolysis) quantitatively according to the reaction, $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$. The mutual removal of the stabilizing agents of both sols by this process of a simple chemical reaction naturally results in the destruction of both colloids.

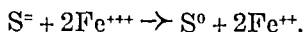
Thomas and Johnson tried also to study the mutual precipitation of ferric oxide and arsenious sulfide sols as a function of the reaction between the stabilizing ferric chloride of the iron oxide sol and of the stabilizing hydrogen sulfide of the arsenious sulfide sol. The errors existing in the present quantitative methods for the determinations of arsenic and of sulfur are large enough to render an analysis of the $x\text{As}_2\text{S}_3.y\text{H}_2\text{S}$ complex impossible, due to the small amounts involved. In the mutual precipitation of ferric oxide sol and arsenious sulfide sol one of the following reactions may take place: (1) $\text{H}_2\text{S} + 2\text{FeCl}_3 \rightarrow 2\text{FeCl}_2 + \text{S} + 2\text{HCl}$; (2) $3\text{H}_2\text{S} + 2\text{FeCl}_3 \rightarrow 2\text{FeS} + \text{S} + 4\text{HCl}$.

Generally in the precipitation of iron oxide hydrosol by colloidal arsenious sulfide there is no evidence of the latter reaction, since the precipitate is yellow. When, however, the sol contains a large amount of hydrogen sulfide, a blackening develops which can be explained by the formation of ferrous sulfide.

To test the supposition that the mutual precipitation between ferric oxide sol and arsenious sulfide sol is due to the oxidation of the sulfide ion of the stabilizing hydrogen sulfide by the ferric ion of the stabilizing ferric chloride, the following experiment was performed.

Five hundred cc. of an arsenic trisulfide sol was precipitated by a ferric oxide sol, the precipitate dried and extracted with carbon disulfide. SULFUR WAS RECOVERED.

The presence of sulfur in the gel can be accounted for only through the following chemical reaction,



In view of the evidence submitted by Freundlich and Nathansohn and by Thomas and Johnson, it would appear that the older electrical charge theory of colloid interaction must give way to the chemical reaction hypothesis.

Hydrophilic colloids, such as the proteins, mutually precipitate under certain conditions. It has been shown that protamine²⁶ precipitates other proteins, and that histone²⁷ precipitates hemoglobin, serum albumin and globulin. Mutual coagulations between clupein, thymushistone, casein, and hemoglobin have been described by Beth af Ugglas,²⁸ while Hunter²⁹ also has contributed to this knowledge.

The significance of the hydrogen-ion concentration of the solution in mutual precipitation of proteins was demonstrated by Michaelis and Davidsohn.³⁰ They stated that when two amphoteric colloids, such as proteins, are brought together in solution, a compound may be formed and precipitate, the condition for most complete precipitation being a hydrogen-ion concentration between those of the isoelectric points of the reacting ampholytes. Thus when one protein is present as a cation and the other as an anion, the formation of a compound is to be expected, whereas when both proteins are cations (the pH is acid to both of their isoelectric points) or where both are anions (the pH is on the alkaline side of both isoelectric points) a combination between them is not to be expected. The combination between pairs of proteins has resulted in insoluble complexes in practically all cases tried, but since a great deal of work has yet to be done on this subject, it is not safe, at present, to state that proteins always precipitate one another if mixed together at a pH between their isoelectric points. Michaelis and Davidsohn

²⁶ Kutscher: *Z. physiol. Chem.* 23, 117 (1897). Bang: *Ibid.* 27, 483 (1899).

²⁷ Malengreau: *Le Cellule* 21, 121 (1903).

²⁸ Beth af Ugglas: *Biochem. Z.* 61, 469 (1914).

²⁹ Hunter: *Z. physiol. Chem.* 53, 526 (1907).

³⁰ Michaelis and Davidsohn: *Biochem. Z.* 39, 496 (1912).

found also that the optimum pH for the mutual precipitation of proteins varies with the relative amounts of the proteins reacting; when a large excess of one component is present the pH optimum for precipitation will shift toward the isoelectric point of this component.

The precipitation optimum for a mixture of aqueous dispersions of nucleic acid and serum albumin was found to be at $\text{pH} = 4.05$ to 4.22 which is between the isoelectric points of the components, while a mixture of nucleic acid and heat denatured serum albumin precipitated best at $\text{pH} = 3.8$. When the ratio of nucleic acid to the albumin was increased, the optimum reaction for precipitation shifted toward the acid side, *i.e.*, toward the isoelectric point of nucleic acid.

Casein and nucleic acid precipitated each other in a pH range of 4.05 to 2.52 depending upon whether casein or nucleic acid was present in excess. Mixtures of casein with both genuine and denatured serum albumin were found to result in precipitation. Variation in the mass relationships made no difference, due to the fact that the isoelectric points of these proteins are so close together.

Michaelis and Davidsohn³¹ investigated the influence of pH in specific precipitations. Using as precipitin the serum of a rabbit that had been previously sensitized with sheep serum, flocculation of this precipitin and sheep serum was obtained equally well at $\text{pH} = 9$ as at $\text{pH} = 5$, thus showing no dependence upon the hydrogen-ion concentration. This sort of reaction is then different from protein mutual precipitation.

De Kruif and Northrup³² have recently shown the same to be true for the agglutination of *Bacillus typhosus* by immune serum. They found the amount of immune body combined with the organisms is constant from $\text{pH} = 9$ to $\text{pH} = 3.7$ and that the combination is not caused by a difference in sign of the charge carried by the immune body and the organism.

The flocculation of bacteria by proteins, however, has been demonstrated to be similar to protein mutual precipitations.³³

³¹ Michaelis and Davidsohn: *Biochem. Z.* 47, 59 (1912).

³² De Kruif and Northrup: *J. Gen. Physiol.* 5, 127 (1922).

³³ Eggerth and Bellows: *J. Gen. Physiol.* 4, 669 (1922).

Eggerth and Bellows found that a suspension of *B. coli* is agglutinated by gelatin, crystallized egg albumin, proteoses, edestin and oxyhemoglobin at hydrogen-ion concentrations between the isoelectric point of the protein and the acid flocculation zone of the bacterial suspensions, the latter having been found to lie between pH 1.6 and 3.0.

The proteins of blood serum are precipitated by lecithin suspensions at pH values between the isoelectric points of the reacting substances. The isoelectric points (or pH values for the flocculation optima) of lecithins have been found to vary from pH 2 to 4, depending upon the source.³⁴ As the proportion of blood serum to lecithin is increased the optimum precipitation tends to shift toward the reaction of the isoelectric point of the blood serum proteins.

An interesting example of the mutual precipitation of hydrophilic or "protective" colloids is that of gelatin with gum arabic. This gum appears to consist mainly of the calcium salt of a complex carbohydrate acid. In view of the work of Jacques Loeb, one would expect a precipitation of gelatin by gum arabic in solutions on the acid side of pH 4.7 (the isoelectric point of gelatin) provided gelatin arabate is an insoluble compound.

Thomas Graham showed that gelatin is precipitated by "gummic acid," the coagulum settling out to form a jelly-like mass. This has been rediscovered by Tiebackx,³⁵ whose attention to it was aroused by the fact that oil-in-water emulsions "broke" upon mixing if one was emulsified with gum arabic and if gelatin was the emulsifying agent in the other one. He found that gelatin and gum arabic mutually precipitate in a solution sufficiently acid to ensure the presence of gelatin cations, the coagulum setting to a jelly when warmed. In the presence of an excess of gelatin this precipitation does not occur. This is an example of the "protective" effect of an excess of one of the hydrophilic components. Tiebackx also noted that gum tragacanth precipitates gelatin.

Protective Action

When a solution of a hydrophilic colloid is added to a less stable colloidal dispersion, or suspension, generally there is no

³⁴ Feinschmidt: *Biochem. Z.* 38, 244 (1912).

³⁵ Tiebackx: *Kolloid Z.* 8, 198, 238 (1911); 31, 102 (1922).

change in appearance of the system and the less stable dispersion is found to have become more stable, *i.e.*, it is no longer so sensitive toward coagulation by either the addition of electrolytes or by evaporation to dryness. The less stable dispersion is said to have been "protected" by the hydrophilic colloids such as gelatin, gum arabic, albumin, etc.

The discovery of protective action may be attributed to Michael Faraday who noted that the addition of gelatin to his colloidal gold dispersions rendered them so stable that it was possible to evaporate them to dryness without change in color.³⁶

Since there appears to be a general tendency to regard "protective" colloids as a class that always confers increased stability upon lyophobic colloids, it would be well to stop for a moment in order to show that "protective" colloids do not differ so radically from others in their conduct in mutual reactions. It is more a difference in degree than in kind. For example, hydrophilic colloids may precipitate other dispersions. A number of instances have just been cited where certain protective colloids precipitate each other.

The precipitation of alumina hydrosol by "protective" gelatin was observed by Thomas Graham. This appears to have been overlooked since in recent colloid literature one notes reports of the discovery that protective colloids occasionally do not protect. One such report is that of Brossa and Freundlich.³⁷ These authors find that the addition of a small amount of well dialyzed albumin solution to ferric oxide hydrosol renders the latter more sensitive toward the precipitating influence of electrolytes, rather than more stable. The explanation for this is simple, and will be returned to later.

Protective colloids may protect less stable dispersions or may render them still less stable, even resulting in mutual precipitation depending upon the signs of the charges* of the protector and hydrophobe, and upon the relative proportions of the two sols brought together. The significance of the signs of the charges carried by the two colloids interacting was shown by

³⁶ Phil. Trans. 147, 184 (1857).

³⁷ Brossa and Freundlich: Z. physik. Chem. 89, 306 (1915).

* Ionic charges.

Billitzer,³⁸ who noted that a solution of gelatin which contains a trace of acid will precipitate arsenious sulfide sol, while when a negative charge is conferred upon the gelatin by addition of a very small amount of ammonium hydroxide, it will then mutually precipitate with ferric oxide sol. If, however, a slightly positive gelatin is mixed with the ferric oxide sol, protection takes place. The complex is not precipitated by the addition of a slight amount of ammonium hydroxide but the sign of the charge of the complex is changed from positive to negative.

In view of the modern chemistry of protein solutions, and the envelope theory of protection enunciated by Bechhold,³⁹ an explanation is available. The solution of gelatin in dilute ammonium hydroxide contains not only ammonium and gelatinate ions but also ammonium hydroxide and its ionization products, *i.e.*, ammonium gelatinate hydrolyzes in aqueous solution. The stability of ferric oxide sol is due to the ferric chloride, or acetate, as the case may be, that is combined with the ferric oxide particles. When these two sols are mixed the ammonium hydroxide and ferric chloride or acetate react to form hydrous ferric oxide. If the condition of "isoelectric" proportions of the interacting sols obtains, then precipitation ensues due to the removal of all of the stabilizing agent of the ferric oxide sol, and due to the fact that there is not sufficient gelatin present to "protect" it, *i.e.*, to form envelopes around the ferric oxide particles and thus keep the latter in dispersion through the solution forces of the gelatin. It must be noted as well that gelatin at or near its isoelectric point (hydrogen-ion concentration at which its ionization is at a minimum), is much less stable in solution than in the presence of acid or alkali, as shown by Jacques Loeb.

On the other hand, when the inorganic colloid is present in large excess, the neutralization or the removal of a part of its stabilizing agent is not sufficient to throw it out of solution, while in the case of a large excess of oppositely charged gelatin, no precipitation ensues due to the enveloping of the "neutral-

³⁸ Billitzer: Z. physik. Chem. 51, 129 (1905).

³⁹ Bechhold: Z. physik. Chem. 48, 385 (1904).

ized" inorganic colloid particles by gelatin, which by reason of its solution forces maintains the "neutralized" particles in suspension. The sign of the charge depends simply upon whether gelatin cations or anions are present, *i.e.*, whether it is an acidic or alkaline solution.

Hence when Billitzer mixed gelatin, ammonium hydroxide and ferric oxide sol in the order named, it is easily seen why he got flocculation. When he mixed acidified gelatin, ferric oxide sol and ammonium hydroxide he did not get flocculation of the mixture because gelatin films had formed around the ferric oxide particles. Addition of ammonia merely changed the envelopes of cationic gelatin to gelatin anions. Had he, however, added the base slowly he would have noted a point of very low stability of the gelatin-enveloped ferric oxide particles, namely at $\text{pH} = 4.7$, the isoelectric point of this protein.

The sensitizing action of well dialyzed albumin (Brossa and Freundlich) upon ferric oxide hydrosol can be explained similarly since, in neutral aqueous solution this protein is on the alkaline side of its isoelectric point, *i.e.*, it is negatively charged (anionic) and forms salts with the ferric ion of the stabilizing ferric salt, or causes hydrolysis of the latter due to its combination with the hydrochloric or acetic acid in hydrolytic equilibrium with the stabilizing ferric salt of the ferric oxide hydrosol.

To summarize, a hydrophilic colloid will protect a less stable dispersion at all concentrations of the former provided its sign of charge is like that of the latter. If it carries a charge of opposite sign, it will protect the less stable dispersion if an amount in excess of the isoelectric mixture is present. If added in amounts such as to give an isoelectric mixture or less than the same then the stability of the less stable dispersion will be decreased, possibly resulting in precipitation.

Various hydrophilic colloids show different protective effects, as revealed by the well known "gold number" method of Zsigmondy.⁴⁰ The "gold numbers" are useful solely as very rough indices of relative protective powers, because the "gold number" of a given "protective" colloid depends so largely upon many

⁴⁰ Zsigmondy: *Z. anal. Chem.* 40, 697 (1901).

conditions which limits of time and space prohibit discussing here.

Attempts have been made to apply the gold number method to analysis of urines. The presence of protective substances in urines have been found,⁴¹ but it is doubtful whether the method can have any diagnostic value. Ottenstein⁴² has been unable to find characteristic gold numbers in urines from certain pathological cases. He notes that the gold number of the well dialyzed solids of normal urines ranges from 3.5 to 7.0 while in disease, fluctuating values are found both above and below the "normal" values and not at all characteristic for any one pathological condition.

The envelope mechanism of protective action has been quite definitely proven by Jacques Loeb⁴³ by a comparison of the stability of protein solutions with that of dispersions of protein-coated collodion particles.

A small quantity of an aqueous collodion suspension was placed in contact with an aqueous solution of a protein. The particles were centrifuged from the protein solution and made up to a creamy suspension in water at a desired pH. This suspension of protein-coated particles was added to various salt solutions to note the behavior. The effects of various salts were followed by electrophoresis measurements and observation of the concentrations of a given electrolyte which caused precipitation. It was found that the conduct of the protein-coated particles is identical to that of a solution of the protein. The concentrations of different salts required to precipitate suspensions of gelatin-coated collodion particles in water are practically identical with the concentrations of the same salts required to "salt out" gelatin from aqueous solutions. Furthermore, he found that just as the solubility of gelatin at its isoelectric point (pH=4.7) is increased by the addition of certain kinds and amounts of salts, isoelectric gelatin-coated collodion particles are rendered more stable in an identical manner.

⁴¹ Lichtwitz and Rosenbach: *Z. physiol. Chem.* 61, 112 (1909); Lichtwitz: *Ibid.* 64, 144 (1910); Salkowsky: *Berlin klin. Wochenschr.* (1905).

⁴² Ottenstein: *Biochem. Z.* 128, 382 (1922).

⁴³ Jacques Loeb: *J. Gen. Physiol.* 5, 479 (1923).

Loeb noted a peculiar behavior in the case of egg albumin. He found that it is not a good protective colloid for collodion suspensions. Investigation of the properties of albumin-coated collodion particles showed them to be practically identical in stability to that of suspensions of denatured (heat coagulated) albumin particles. He postulated that when egg albumin forms a film of its solution about collodion particles, the albumin molecule undergoes a rearrangement or orientation to render its water soluble groups ineffective.

Loeb also found casein and edestin to be poor protectors for collodion particles. He defined protective colloids as follows:

“Protective colloids must be capable of forming a durable film on the surface of suspended particles and the molecules constituting the film must have a higher attraction for the molecules of the solvent than for each other; in other words, they must possess true solubility. Only in this case can they prevent the precipitating action of low concentrations of electrolytes on particles which are kept in suspension solely by the high potentials of an electrical double layer. Thus gelatin films, in which the attraction of the molecules for water is preserved, have a general protective action, while crystalline egg albumin, casein, and edestin, which seem to lose their attraction for water when forming a film, have a protective action only under limited conditions . . .”

In conclusion, it may be stated that modern colloid chemistry emphasizes chemistry. Colloid chemistry is the chemistry of solutions or dispersions of practically non-diffusible dispersed phases. This is not new; it was the basis of Graham's origination of colloid science but was forgotten until so vigorously revived by Loeb.

Since colloidal particles are practically non-diffusible they are chemical individuals of very high molecular weight, or consist of a large number of low molecular weight molecules adhering together forming a heavy aggregate.

DEPARTMENT OF CHEMISTRY,
COLUMBIA UNIVERSITY.

THE APPLICATION OF MODERN CONCEPTS OF COLLOIDAL CHEMISTRY TO MEDICINE

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(From the Department of Medicine, College of Physicians and Surgeons, Columbia University and the Presbyterian Hospital, New York. Delivered before the New York Academy of Medicine, February 5, 1925.)

I

Perhaps the most important rôle of science in the history of civilization has been the substitution of a simple physical and chemical explanation of the phenomena of nature for that shroud of superstition and mysticism which for centuries retarded the advance of human knowledge. In the application of these physical and chemical laws to the explanation of vital processes certain difficulties have been encountered. These difficulties have in part resulted from the fact that the proteins and certain other colloids which are important constituents of protoplasm do not appear to obey the laws which apply to other substances. In order to surmount these difficulties, a new and special chemistry has been developed. Pioneer workers in the field of colloidal chemistry have attempted to explain the phenomena which they observed on the basis of this special chemistry, the theories of which are complicated and at variance with the usual laws of chemistry. Recent investigation has shown, however, that there is in fact nothing mysterious about these colloids and that they also obey the laws of classical chemistry when the conditions of the experiment are properly controlled. I shall try this evening to trace as simply as possible the development of colloidal chemistry, and to show that the modern concepts in this branch of chemistry promise to reveal the cause of many hitherto perplexing biological phenomena. As the time allotted to me is short, my discussion will be limited entirely to the proteins.

II

In 1861 Thomas Graham first proposed a distinction between crystalloids and colloids. According to him these two groups of substances differ in three important respects. First, crystal-

loids have a tendency to separate out of solution as crystals, and colloids as a rule separate out in amorphous or glue-like masses. Second, crystalloids diffuse readily through certain membranes (parchment, pig's bladder and collodion) whereas these same membranes are very slightly if at all permeable for colloids. Finally, colloids exist in solution in a condition of "physical aggregation," whereas crystalloids do not show this characteristic, *i.e.*, they are present in molecular form. These distinctions, as made by Graham, mark the beginning of so-called colloidal chemistry, which were it not for precedent might be more appropriately termed the physical chemistry of the colloidal state, for many crystalloids may possess colloidal properties under appropriate conditions.

Soon after Graham distinguished between crystalloids and colloids, the property of aggregation came to be considered of paramount importance and the lack of diffusibility of the particles (termed by Naegeli micellae or crumbs) was considered of only secondary significance. It would have been more fortunate for colloidal chemistry had the emphasis been placed upon the difference in diffusibility between crystalloids and colloids, for the recent work of Jacques Loeb has shown that many of the colloidal properties of proteins can be entirely and satisfactorily explained as a result of this difference.

However, to explain the properties of swelling, osmotic pressure, changes in viscosity and precipitation or flocculation of proteins, the adsorption theory was developed. This theory is based upon the idea that the particles of proteins are not in molecular solution but that they are present in clumps of molecules, which are impermeable for the solution. Hence it was thought that the true molecular reactions of classical chemistry could not take place between these clumps and electrolytes in the solution, and that all reactions must consequently occur only at the surface of the clumps. This meant that the proteins would not obey the law of multiple proportions and other familiar laws of chemistry. In order to explain the extraordinary reactions of colloids a purely empirical formula was developed by Freundlich. While certain reactions could be accounted for by this formula, it was found to hold only within

certain very narrow limits. On the basis of the adsorption hypothesis many of the reactions were at first considered to be physical in nature. Later Bugarszky and Liebermann, Pauli, and others came to believe that the reactions of proteins were purely chemical but that ions were "adsorbed" preferentially by the proteins. This idea was developed by W. B. Hardy and later by Perrin, who suggested that the proteins adsorbed hydrogen ions in acid solution and OH ions in alkaline solution, because in acid solution particles migrated to the cathode in an electrical field, whereas in alkaline solution they migrated to the anode. At a point near neutrality no migration occurred and this point was termed the isoelectric point. It was observed that precipitation of proteins was greatest at the isoelectric point, whereas osmotic pressure and swelling were at a minimum, and it was assumed that this was due to the fact that charges on the particles had been "annihilated" by an ion of opposite charge, thereby permitting the suspended particles to coalesce. The adsorption theory seemed in accordance with the old findings of Hofmeister that various ions even with the same valence had different effects on properties such as swelling, osmotic pressure and viscosity. Alterations in viscosity, osmotic pressure and swelling brought about by salts, acids and alkalis were assumed by Pauli and Ostwald to be due to the fact that protein molecules or micellae were surrounded by jackets of water, these being greatest in certain concentrations of acids and alkalis, being lessened by the addition of salt and being at a minimum at the isoelectric point where no shell of water was thought to be present. - There was no experimental evidence for this view yet it constitutes the well known hydration theory of colloids upon which theories of edema have been built. That this hypothesis of hydration of the proteins is superfluous will be shown later.

The further colloidal chemistry developed, the more vague and unwieldy it became, because the adsorption theory had practically no quantitative data for its support, and because the truly colloidal phenomena of swelling or osmotic pressure, viscosity and precipitation were confused with purely molecular phenomena of solubility, cohesion, adhesion and surface tension, which form a part of the physics of the electron.

That a great state of confusion did exist, and that no correlation of the great mass of data accumulated in chemical and biological science was possible, may be seen from the words of Zsigmondy, a leader among the colloidal chemists. He states that " . . . no general theory of colloids can be given, for the study of colloids has become a great and extensive science in the development of which many must assist; only when the . . . material has been properly systematized will a theory of colloidal solutions be raised from *mere consideration of the similarities in special cases to the standing of an exact science.*"

III

A turning point in the history of modern colloidal chemistry was the development of simple methods for the determination of hydrogen-ion concentrations by Sørensen, Michaelis, and Clark, for it was by the application of these methods that Jacques Loeb was able to prove his contention made in 1904 that proteins are highly hydrolyzed amphoteric electrolytes which probably obey the familiar laws of classical chemistry, and therefore that no new chemistry need be developed to explain colloidal phenomena.

In 1917 Loeb began his studies of the proteins. His first important contribution was the discovery that when the pH of the solution is controlled, proteins combine with acids and bases exactly as do other amphoteric electrolytes. For example, it takes three times as much $\frac{N}{10}$ $H_3 PO_4$ to bring an isoelectric

protein to pH of three as it does of $\frac{N}{10}$ HCl or $\frac{N}{10}$ HNO_3 , for at this range of pH $H_3 PO_4$ acts as a monobasic acid and therefore only one of the three hydrogen ions is active. It was also shown that a protein combines only with acids on the acid side of its isoelectric point forming salts of the type of protein chloride or sulphate and it combines only with bases on the alkaline side of its isoelectric point forming metal proteinate such as sodium proteinate. These observations showed that the assumption of adsorption was quite unnecessary. Furthermore, these results showed that the aggregates which may be present

in a protein solution react with electrolytes as though they were individual molecules in solution, in contrast to the idea of masses in which surface forces alone are responsible for reactions.

The next step taken to disprove the adsorption theory was to show that the weird Hofmeister series of ion effects largely disappeared when the pII was controlled and differences in solubility were eliminated. Thus it became clear that apparently only the *valency* of the ion with a charge opposite to that of the protein was of significance in influencing colloidal behavior.

The final step necessary to disprove the adsorption theory was to find some mathematical expression which would account for the colloidal behavior of proteins. This revealed itself in the so-called Donnan equilibrium. In 1911 Donnan showed that when a membrane separates two solutions of electrolytes (and the principle holds only for electrolytes) one of which contains an ion which can not pass through the membrane, the result will be an unequal distribution of the diffusible ions on the two sides of the membrane. This unequal concentration of the crystalloidal ions must give rise to osmotic forces and to differences in electrical potential between the two solutions separated by the membrane. In almost innumerable experiments, in which potential differences have been determined simultaneously with the changes in the colloidal properties, Loeb and his coworkers have shown that these forces explain the colloidal behavior of proteins.

At the isoelectric point of a protein, colloidal properties are at a minimum, as is the potential difference, because here there is no ionization of the protein; therefore no Donnan equilibrium is established and consequently electrolytes distribute themselves equally on both sides of the membrane. Upon the addition of a small amount of acid or alkali, the protein is ionized, a Donnan equilibrium is established and colloidal properties are seen to be at a maximum, for here the concentration of crystalloidal ions is greater in the protein solution than in the outside solution free from protein. Upon the further addition of an acid or alkali, or of a neutral salt, the colloidal properties again diminish, as does the potential difference between the protein

solution and its watery environment, for here the P.D. is depressed by the ion of opposite sign of the protein. The higher the valency of the oppositely charged ion, the greater the depressing effect.

So much for the theories of colloidal behavior. Had the older colloidal chemists had the advantage of the more recent investigations, theories of edema like that of Martin Fischer, which for some years stimulated clinicians to use therapeutic measures, perhaps not entirely rational, would not have received serious consideration.

IV

In the last chapter of the second edition of his book on "Proteins and Theory of Colloidal Behavior," Loeb says:

"Life phenomena cannot be dissociated from colloidal behavior and the idea of an organism or of living matter consisting exclusively or chiefly of crystalloidal material, or of material with purely crystalloidal behavior, is inconceivable. Organisms have been defined as chemical machines consisting essentially of colloidal material capable of growing and automatically reproducing themselves. If this be true, advance in general physiology will be chiefly a hit or miss game until science is in possession of a mathematical theory of the colloidal behavior of the substances of which living matter is composed. If Donnan's theory of membrane equilibria furnishes the mathematical and quantitative basis for a theory of colloidal behavior of the proteins, as the writer believes it does, it may be predicted that this theory will become one of the foundations on which modern physiology will have to rest."

Only a few years have elapsed since this statement was made but in this short time there have been distinct advances based on the newer concepts of colloidal chemistry. The following examples taken from various fields of biological science will serve to illustrate this point.

The factors determining the digestion of proteins by pepsin have for years puzzled physiological chemists and as Sørensen has indicated, many observations and theories were contradictory largely because of the failure to measure the hydrogen-ion concentration of the solutions employed. No thorough under-

standing of the factors involved in the action of pepsin was possible until the chemistry of the proteins upon which it acts, was thoroughly understood. Since this has been made possible, Northrop has systematically restudied the problem with the result that pepsin action is now quite understandable and has been shown to follow the laws of classical chemistry, the assumption of adsorption by the protein, or its cleavage products, being unnecessary. He has shown that pepsin acts largely or entirely on ionized protein, as suggested by Nasse, Pauli and Euler, and that the degree of aggregation (*i.e.*, whether the protein be in solution or precipitated) makes no difference. Furthermore, he has shown that apparent deviations from the law of mass action, which were thought to be due to adsorption, result merely from an equilibrium between pepsin and the peptone formed in the process of digestion, and that the substance so formed also follows the usual laws of chemistry. Northrop has extended his study to trypsin digestion with equal success, though the problem is somewhat more complex.

In the realm of immunology, possibly more than elsewhere, a state of turmoil has existed as a result of lack of understanding of the chemistry of proteins, but that there are better times ahead may be surmised from Gideon Wells's statement that "such studies as those of Jacques Loeb on the behavior of protein solutions bid fair to throw *more* light into the knowledge of immunity than most of the *direct* investigations of immunological problems."

Northrop and De Kruif have approached the problem of agglutination by a study of the stability of bacterial suspensions and their results have been in part well summarized by Shibley, who says:

"According to these writers agglutination may be considered in terms of two antagonistic forces, a *repelling* force which keeps the bacteria apart, due to like charge on the bacteria, and a cohesive or sticking force, which is probably a function of surface tension. In any bacterial suspension these forces may be thought of as opposed to each other; greater relative repelling force making for stability, and greater relative cohesive force leading to flocculation. They have shown, in the case of both

unsensitized and sensitized bacteria, that agglutination takes place as soon as the potential is reduced (by electrolytes) to a critical zone lying between about -15 and $+15$ millivolts, provided the cohesive force is unaffected; that is, the cohesive force then becomes relatively greater than the repelling force. They have shown in the case of unsensitized bacteria, that salt in high concentration (over 0.01 N) reduces the cohesive force and, at the same time, narrows the critical potential agglutination zone; but that in the case of sensitized bacteria such reduction of cohesive force and of potential agglutination zone does not take place. And they have furthermore found that all electrolytes tested in low concentration (less than 0.01 to 0.1 N) affect primarily the potential, while in concentration greater than this, the effect is principally on the cohesive force."

Shibley, working at the Presbyterian Hospital, has extended these studies to the phenomenon of spontaneous agglutination of streptococci, and finds that this apparently occurs when the cohesive forces are higher than those usually present in salt solutions commonly employed as electrolyte in specific agglutination reactions. He has also shown that immune agglutinating sera possess a specific charge-reducing substance which is quantitatively related to the agglutination titer of the serum, and that in absorption experiments this substance is lost. Highly protective but non-agglutinating sera cause no diminution in electrical charge.

At the Presbyterian Hospital, Dr. Palmer, Dr. Atchley and I have been interested in the study of edema. We have made simultaneous analyses of blood serum and edema fluids (from the chest or abdomen) taken from patients suffering from nephritis, cirrhosis, cardiac disease and tuberculous pleurisy. These analyses showed certain constant features. Regardless of the cause of edema, whether the fluid be exudate or transudate, it was found that the Cl concentration in the edema fluid was always higher than that of the blood serum, that the K content of the blood serum was greater than that of the fluid, that the sodium, bicarbonate, sugar and urea, were equally distributed between both. In view of the recent application of the Donnan equilibrium to the chemistry of proteins it seemed that this might be the cause of the unequal distribution of

potassium and chlorine between the blood serum and edema fluid. To test this, blood serum was separated from the corresponding edema fluid by a collodion membrane and the system was allowed to come to equilibrium. Analyses of the serum and edema fluid were again made and the discrepancies, before noted, persisted. Thus evidence was found that blood serum and edema fluid are in equilibrium as though they were separated *in vivo* by a collodion membrane, and that the equilibrium is probably a manifestation of that described by Donnan.

Recently Van Slyke, Wu and McLean have made an intensive study of the factors controlling the electrolyte and water distribution in the blood. First, they studied the relations determining equilibria between red blood cells and the serum in which they are bathed. Then they studied the equilibria between blood serum and tissue fluid. They have found that if we assume that three laws holding for dilute solutions also hold for blood (one of these being the Donnan equilibrium), then, mathematical expressions can be derived which will predict the distribution of electrolytes between cells and serum.

From this brief resumé, it may be seen that the modern concepts of protein chemistry have already greatly enhanced our understanding of enzyme action, of agglutination and of water balance in the body. All three of these mechanisms are, of course, decidedly important to the clinician.

In conclusion, I should like to say a few words regarding the relation of medicine to purely physico-chemical study of the type presented this evening. It is the function of the physician to treat disease, but to do this successfully he must know its cause. This has been axiomatic since the days when Hippocrates taught his followers that disease was a part of the course of nature, rather than the product of supernatural influences. To understand the abnormal, we must naturally have clearly in mind the laws governing normal function or physiology. To understand normal function we must be able to measure quantitatively those physical and chemical forces by which it is controlled, and we must furthermore be able to predict mathematically what changes will take place under various conditions. Towards the accomplishment of this end, the modern concepts of protein chemistry appear to be of great significance.

LIBRARY NOTES

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THE NATIONAL UNION LIST OF SERIALS

The Library of the New York Academy of Medicine has recently joined the ranks of libraries cooperating in the publication of a national union list of serials. The term serial, as applied to the holdings of the Library of the Academy, includes medical journals in all languages; transactions of medical and other scientific societies, local, national and foreign; reports of hospitals, clinics and social welfare institutions and organizations; and publications of colleges and universities in this country and abroad that have appeared or are appearing in periodical form.

When this work of listing and recording the holdings of the cooperating libraries is complete, the results will be put in printed form and distributed to the libraries as a "provisional list." This list will be used as a basis of exchange and as a "want" list among the cooperating libraries, which will thus be enabled to complete imperfect sets or to acquire new ones by purchase or exchange. Such changes and additions will be recorded in the "provisional list," which will then be returned to the publishers in charge of the work, the H. W. Wilson Company, of New York City, and a permanent list will then be printed and distributed for use in the various libraries.

This final list will be of great value, not only to the individual libraries as a bibliography of their periodical material, but to the whole field of medical, scientific and research work. For it will be, first, a bibliography in alphabetic form of all important

serial publications, both defunct and current, in the various countries of the world. Moreover, under each entry will be indicated just what sets, complete or otherwise, are to be found in the cooperating libraries of the United States and Canada. This means that a vast field of material in these libraries will be made available for use and consultation to readers and workers in the many different fields represented by the libraries, which are both general and special in scope.

The large and valuable collection of medical periodicals and other serial publications on related scientific subjects in the Library of the Academy of Medicine is now being recorded and entered in this union list. The result will be that its value and usefulness will be manifoldly increased and augmented by being made available to the whole field of medicine in America. This is the first time in history that a union list of serials has been compiled on a national basis, so the work is a vast and complex one; but the undertaking will more than justify all effort by its tremendous significance as a definite step toward the scientific organization and rendering available for practicable use of the vast but widely separated sources of scientific, technical and literary material in the libraries of North America.

REGULATIONS GOVERNING DONATIONS TO THE LIBRARY FUNDS,
ADOPTED BY THE COUNCIL OF THE ACADEMY,
JANUARY 28, 1925

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THE NEED OF HOSPITAL PROVISION FOR CHRONIC PATIENTS

More people die from chronic diseases than from acute. The proportion would undoubtedly be even much higher than the mortality statistics indicate, if every death certificate were carefully made out and showed the chronic disease which is largely responsible for the fatal result as well as the immediate cause of death or the terminal condition. For example, a patient with neurosyphilis and an involvement of the liver, heart and kidneys whose death is immediately due to static pneumonia may be reported as having died of “pneumonia,” if the physician does not care to report beyond that. No extensive morbidity statistics are available to supplement our knowledge of the prevalence of chronic illness.

The problem of "the chronic" has been characterized as a challenge to the medical profession, and some day this challenge will have to be met.

The out-patient departments of the hospitals are filled with people of the poorer classes who seek relief from some distressing or incapacitating chronic ailment. Their needs are met to some extent in this department of the hospital but it is difficult to give them adequate attention under present conditions. There is, however, a very large group of patients for whom a visit to the dispensary and a bottle of medicine can do very little unless it is accompanied by a carefully supervised regimen of rest and diet, or perhaps some form of physiotherapy for a prolonged period. Very few of the poorer classes, if any, are able to secure this at home and the hospitals will not take them. A few convalescent homes will open their doors to them but they can only stay for a few weeks—so brief a sojourn may benefit a patient convalescing from an acute condition, but for the chronic sufferer it is scarcely long enough to exert any appreciable influence. Moreover very few convalescent homes are prepared to give the careful medical supervision and scientific study which is so frequently needed if a patient with a chronic disease or condition is to improve or to be restored to economic usefulness.

Since the general and special hospitals are concerned chiefly with the care of the acutely ill, and the convalescent homes, with one or two exceptions, are not equipped to care for the chronic, special institutions for their care and study seem to be necessary if progress is to be made in this long neglected field. The need of institutions of this type is well recognized. Proprietary institutions endeavor to fill the need of those who can afford to pay but the facilities for people of small income are almost nil.

The sufferers from the various rheumatic diseases; from cardiac and vascular troubles of various kinds and degrees; those with mucous colitis, and other gastro-enteric diseases who can not carry out the required mode of life in their homes; those with affections of the neuromuscular system; with leg ulcers; renal affections; orthopedic cases, and many others require the facilities of special institutions. These are very limited in New York City, and with a single exception, unsatisfactory. They were established chiefly to provide custodial care for chronic

conditions that have reached the incurable stage, and the medical attention usually provided is of an indifferent character. What is urgently needed are hospitals for the care of those who have not yet advanced to this hopeless state. Active medical work of high grade will mean the salvaging of many of these men and women afflicted with ailments generically and dismally known as chronic.

The municipality recognizes its obligation in the matter and maintains in its hospitals many patients who are chronically ill, but in City Homes (or Almshouses) and at the Central Neurological Hospital only advanced or custodial cases are admitted. Consideration is now being given to the question of devoting one of the existing municipal hospitals for the types of cases described above. The Public Health Committee of the Academy of Medicine has conferred with Mr. Bird S. Coler, Commissioner of the Department of Public Welfare, concerning the matter and has enlisted his active interest. One institution may not be enough, but this is a matter which experience will determine. Private philanthropy may supplement the municipal endeavor as it has so nobly done in the case of tuberculosis sanatoria. The latter, if the hope for further reduction of tuberculosis is realized, may be turned over for the care of other types of reclaimable sufferers from chronic diseases.

Only men interested in the study and treatment of chronic diseases should be appointed to the medical staffs of these institutions, if these are to function properly. Competent resident staffs and proper nursing are also essential, and the equipment should include all the known therapeutic resources. Boas, Rapleye and others have called attention to the need of study of the progress of chronic diseases, and these hospitals when properly manned will offer an opportunity for such study.

When proper attention is given to the treatment of chronic ailments, the charlatans' field for exploitation will rapidly shrink. At present it is this class of patients who are the prey of unscrupulous healers of many cults.

E. H. L-C

REVIEWS OF THE HOSPITAL SITUATION IN GREATER NEW YORK

The report on "The Hospital Situation in Greater New York" was published late in 1924 in book form by G. P. Putnam's Sons, 2 West 45th Street, New York. It is based on a comprehensive survey of hospital conditions, by a special staff of workers under the direction of Dr. E. H. Lewinski-Corwin, the Executive Secretary of the Public Health Committee, who studied the administrative, medical and nursing procedures of the hospitals and the numerous relationships between the hospitals and the community. The following review published in "The Hospital and Health Review" of London, December, 1924, is one of many illustrating the wide recognition and endorsement which the report has received here and abroad.

"The interest and value of this report to the British reader lie not in the fact that it is what it purports to be, a survey of the hospitals in New York, though that would invest it with both those qualities for many, but that, by reason of the breadth of view with which the topics dealt with are treated, it is very much more. It might well be described as a systematic and comprehensive general study of important hospital questions. The range of subjects of which it treats is so wide, the manner in which each in turn is approached, investigated and discussed is so admirable in its soundness, orderliness and thoroughness; in short, the whole book, alike in matter and method, is so excellent and of so wide an application that we strongly recommend it. It is worthy not only of perusal but of study by everyone who takes an interest in hospital questions. Certainly no hospital administrator, be he committeeman or official, should fail to give it thoughtful study.

It begins, or rather would begin if the reader were to take our advice and read chapter 3 first, with a consideration of the problem of illness among the people, the extent and character of disease, the determining of the illness rate, and the question of the place of the hospital in the treatment of disease. This, in particular, has an application to all places, and is not pertinent merely to New York or even the United States. This chapter is, perhaps, to the British reader, the most interesting of any in the book, inasmuch as it demonstrates the practicability of determining on substantial grounds the relation which the numerical strength of hospital beds should bear to population.

Other chapters treat of revenue and expenditure, concluding with a consideration of surpluses and deficits; administration; medical organization; nursing, including the scarcity of nurses, which prevails in New York as in London—an excellent chapter; hospital records; convalescents; special problems; and community problems, embracing the mutual responsibility of the community to hospitals and hospitals to the community.

It is impossible to comment in detail on the contents of this most valuable treatise—a considerable volume might profitably be devoted to such a purpose. It will, however, perhaps surprise many to learn that, whereas in London, with its population of 7,250,000, the hospitals included in the Statistical Report of King Edward's Fund number 116, contain 12,660 beds, and cost, in round figures, to maintain, £2,630,000; the hospitals in Greater New York, with a population of 5,620,000, number 182, contain 32,000 beds, and cost to maintain \$35,000,000—say, £7,000,000 at par of exchange. The Public Health Committee of the New York Academy of Medicine who publish this survey consists of 33 doctors whose time is occupied for the greater part of the year, and who were assisted during most of this time by a special staff of four physicians, three nurses, three social workers, and two accountants. It is quite as interesting and almost as valuable to the Briton as to the citizen of the United States."

REPORT OF THE COMMITTEE ON MEDICAL EDUCATION

At a joint meeting of the Society for the Advancement of Clinical Information and the New York Association for Medical Education, held October 18, 1923, it was resolved that if the Academy of Medicine concurred, the work of the two organizations should be joined together under the direction of a Committee on Medical Education of the Academy. A resolution was adopted by the Council of the Academy at its meeting in December approving this action. A Committee on Medical Education was thereafter appointed, consisting of the members of the former governing bodies of the two organizations who were Fellows of the Academy, and an Executive Committee with Dr. Charles N. Dowd as chairman.

The activities which the Committee decided upon to take up at once were much the same as those which were announced and carried on by the two organizations which had just been merged. They included plans for the maintenance of a bureau where information in detail should be kept of all graduate opportunities offered in Greater New York, as well as elsewhere in the United States and in foreign countries; this information to be made available for medical men who might make inquiry in person or by letter. Contact with the courses as carried on was to be kept up, in order that the Committee might be advised of the manner in which they were conducted, the qualifications of the teachers, the adequacy of the material and equipment, and so forth. The need of additional special internships or residencies for training in the specialties was to be made a subject for study.

Sub-committees were appointed composed of Fellows of the Academy generally recognized as specially qualified in their particular subjects, to investigate and report upon courses offered in New York. These sub-committees have been actively engaged in the work and with one or two exceptions have already presented their reports.

Based upon these reports synopses have been prepared showing the opportunities for graduate medical study offered in New York in each of the clinical specialties. The sub-committees are made up as follows:

<i>Medicine</i>	Dr. Walter L. Niles, Chairman Dr. Emanuel Libman Dr. Samuel A. Brown Dr. Charles N. B. Camac
<i>Surgery</i>	Dr. Eugene H. Pool, Chairman Dr. Emil Goetsch Dr. Henry H. M. Lyle
<i>Neurology</i>	Dr. Frederick Tilney, Chairman Dr. Foster Kennedy Dr. Charles A. Elsberg
<i>Psychiatry</i>	Dr. Thomas W. Salmon, Chairman Dr. Menas S. Gregory Dr. George H. Kirby
<i>Obstetrics</i>	Dr. George Gray Ward, Chairman
&	Dr. Howard G. Taylor
<i>Gynecology</i>	Dr. William E. Studdiford
<i>Ophthalmology</i>	Dr. James F. McKernon, Chairman
&	Dr. Arnold H. Knapp
<i>Oto-Laryngology</i>	Dr. Cornelius G. Coakley

<i>Public Health</i>	Dr. Haven Emerson, Chairman Dr. William H. Park
<i>Pediatrics</i>	Dr. Rowland G. Freeman, Chairman Dr. Charles Hendee Smith Dr. Oscar M. Schloss
<i>Urology</i>	Dr. Edward L. Keyes, Chairman Dr. J. Bentley Squier Dr. Alfred T. Osgood
<i>Orthopedic Surgery</i>	Dr. Reginald H. Sayre, Chairman Dr. Leo Mayer
<i>Dermatology & Syphilology</i>	Dr. John A. Fordyce, Chairman Dr. Howard Fox Dr. Hans J. Schwartz
<i>Psychiatry</i>	Dr. Thomas W. Salmon, Chairman Dr. Geo. H. Kirby Dr. Menas S. Gregory
<i>Roentgenology</i>	Dr. Jos. M. Steiner Dr. Ross Golden Dr. Harry M. Imboden Dr. Leopold Jaches

The subject of special internships or residencies which are available in New York is now being studied by the Committee. Approved opportunities of this nature will be announced in the synopses in connection with the courses which are offered.

The daily Bulletin of Surgical Clinics has been published daily throughout the year. There has been a considerable increase in the number of hospitals, surgeons and operations posted in the Bulletin. The daily average for 1924 has been

Hospitals	29
Operations, etc.	171
Surgeons	89

The Weekly Bulletin of Medical Clinics posts especially arranged clinics, given at 24 different hospitals. Five hospital services announce a clinic once a month; six, twice a month; one, three times a month; ten, once a week; and two, four times a week or oftener.

The Bureau of Clinical Information posts a list of the fixed clinics of the city. The Bureau aims to furnish information to visiting medical men in regard to courses, lectures, and clinics, and other medical activities of the city.

A total of 436 visitors have called at the Bureau of Clinical Information during the year 1924. They have registered from

every country of Western Europe except Portugal; Russia, Czecho-Slovakia, Armenia; China, Japan, India, Ceylon, Formosa, Australia, South Africa; Argentina, Brazil, Colombia, Chile, Venezuela, Panama, Hawaii, the Philippines, Canada, from coast to coast, and from every state in the Union.

During the year the bureau has gathered much information as to graduate medical work in England and on the Continent. This is being added to and kept up to date through the courtesy of the officials of a number of international agencies, fellowships and societies, and particularly of American medical men returning from a period of study abroad.

LIST OF APPROVED OPPORTUNITIES FOR GRADUATE MEDICAL STUDY OFFERED IN NEW YORK CITY

DERMATOLOGY-SYPHILOLOGY

Columbia University.
Advanced course of 2 yrs.
Group of 7 short courses.
Cornell University Medical College.
1 clinical course.
Post Graduate Medical School & Hosp.
Assistantship in clinic.
Skin and Cancer Hospital.
Special internship.
Montefiore Hospital.
Special internship.
Brooklyn Hospitals.
2 extension courses.

INTERNAL MEDICINE

Columbia University.
6 weeks practical course, full day.
Group of 15 short courses.
Post Graduate Medical School & Hosp.
3 months seminar of full days work.
19 special courses.
Beth Israel Hospital.
Course in Cardiology.
Brooklyn Hospitals.
32 extension courses.
Special Internships.
3 in Mt. Sinai Hospital.
1 in Montefiore Hospital.
4 in Bellevue Hospital.

NEUROLOGY AND PSYCHIATRY

Columbia University.
Group of 16 courses.

Neurological Institute.

Post graduate clerkship.
Post Graduate Medical School & Hosp.
2 special courses.
Cornell University.
3 short courses.
Brooklyn Hospitals.
3 extension courses.
Special Internships.
2 in Bellevue Hospital.
1 in Mt. Sinai Hospital.
1 in Montefiore Hospital.

OBSTETRICS AND GYNECOLOGY

OBSTETRICS

Lying-In Hospital.
2 courses.
Post Graduate Medical School & Hosp.
Manikin course.
Brooklyn Hospitals.
7 extension courses.

GYNECOLOGY

Post Graduate Medical School & Hosp.
1 months seminar, full days work.
8 special courses.
Columbia University.
2 short courses at Mt. Sinai Hospital.
Brooklyn Hospitals.
3 extension courses.

Special Internships in Obs. & Gyn.

- 8 in Lying-In Hospital.
- 4 in Woman's Hospital.
- 1 in Nursery & Child's Hospital.
- 1 in Manhattan Maternity Hospital.
- 5 in Long Island College Hospital.
- 3 in Berwind Maternity Clinic.
- 1 in Harlem Hospital.
- 1 in Mt. Sinai Hospital.
- 1 in Roosevelt Hospital.
- 1 in Brooklyn Hospital.
- 9 in Sloane Hospital for Women.
- 9 in Bellevue Hospital.
- 2 in Community Hospital.
- 1 in Bronx Maternity Hospital.
- 3 in Jewish Maternity Hospital.
- 1 in Brooklyn Hebrew Maternity Hosp.
- 1 in N. Y. Foundling & St. Ann's Mat. Hosp.

OPHTHALMOLOGY

- Herman Knapp Memorial Hospital.*
- 8 months comprehensive course.
- Post Graduate Medical School & Hosp.*
- 7 months comprehensive course.
- 11 special courses. 5 internships.
- Manhattan Ear, Eye & Throat Hosp.*
- Combined 9 months course in Ophthalmology and Oto-laryngology.
- 4 internships in Ophthalmology.
- New York Eye and Ear Infirmary.*
- 9 special courses. 1 internship.
- Brooklyn Eye and Ear Hospital.*
- Clinical course.
- Brooklyn Hospitals.*
- 4 extension courses.
- Mount Sinai Hospital.*
- 1 internship in Ophthalmology and Oto-laryngology.
- Bellevue Hospital.*
- 3 internships.

OTO-LARYNGOLOGY

- Columbia University.*
- 6 months comprehensive course.
- 4 internships in Bellevue Hospital.
- Post Graduate Medical School & Hosp.*
- Seminar of 3 full time courses of 3 months each.
- 16 special courses. 4 internships.
- Manhattan Eye, Ear & Throat Hospital.*
- Combined 9 mos. course in Ophthal-

mology and Oto-laryngology.

- 6 internships.
- New York Eye and Ear Infirmary.*
- 6 special courses. 1 internship.
- Brooklyn Eye and Ear Hospital.*
- 4 special and clinical courses.
- Brooklyn Hospitals.*
- 3 extension courses.
- Mt. Sinai Hospital.*
- 1 internship in Ophthalmology and Oto-laryngology.

ORTHOPEDIC SURGERY

- Post Graduate Medical School & Hosp.*
- 2 months seminar of full days work.
- 10 special courses.
- Brooklyn Hospitals.*
- 4 extension courses.
- Special Internships.*
- 6 in Hospital for Ruptured and Crippled.
- 7 in Hospital for Joint Diseases.
- 1 in New York Orthopedic Hospital.
- 1 in Montefiore Home.

PEDIATRICS

- Columbia University.*
- 2 months course of full days work.
- Group of six-weeks courses.
- Post Graduate Medical School & Hosp.*
- 6 months course of full days work.
- 15 special courses.
- Brooklyn Hospitals.*
- 12 extension courses.
- Pediatric Internships.*
- 6 in Bellevue Hospital.
- 4 in Babies' Hospital.
- 3 in St. Mary's Free Hosp. for Children.
- 1 in Nursery & Child's Hospital.
- 3 in N. Y. Infirmary for Women and Children.
- 1 in Mount Sinai Hospital.
- 2 in N. Y. Foundling & St. Ann's Mat. Hosp.
- 2 in Presbyterian Hospital.
- 2 in Lenox Hill Hospital.
- 1 in Post Graduate Hospital.

SURGERY

- Univ. & Bellevue Hosp. Medical College.*
- 3 years comprehensive course.

Columbia University.

6 weeks course in general surgery at New York Hospital.

Group of 5 courses at Mt. Sinai Hosp.

Course in surgery technique. Operative surgery on animals.

Post Graduate Medical School & Hosp.

Seminar in general surgery, full day.

4 special courses. 7 special courses in operative surgery.

Brooklyn Hospitals.

16 extension courses.

Special Internships.

1 in Post Graduate Hospital.

4 in Mt. Sinai Hospital.

1 in Montefiore Hospital.

2 in Skin and Cancer Hospital.

3 in New York Hospital.

5 in Bellevue Hospital.

UROLOGY

Post Graduate Medical School & Hosp.

6 special courses.

New York Hospital.

1 six months course. 1 special internship.

Roosevelt Hospital.

1 private course. 1 special internship.

Brooklyn Hospitals.

4 extension courses.

Bellevue Hospital.

2 internships.

STATUS OF THE NEW BUILDING, MARCH 20th, 1925

The Carnegie Corporation has appropriated \$1,550,000 for the new building. It is expected that the building can be completed for less than that sum. The Council of the Academy is of the opinion that there will be a sufficient sum remaining from the sale of the old building to pay for the furniture and equipment of the new building.

The floor plans and facade have been approved by the Building Committee, the Council, and the Carnegie Corporation. Working drawings are being pushed to a conclusion.

The contract for steel has been let. Excavation and foundation should be finished by the time steel arrives, which will be in the month of July. The building should take approximately a year and a half for completion after steel begins to go up. The Fellows of the Academy may expect to get into the new building in 1927.

Messrs. York & Sawyer are the architects, Mr. Frank Sutton is Consulting Engineer, and Messrs. Marc Eidlitz & Son, Inc., are the contractors.

DEATHS OF FELLOWS OF THE ACADEMY SINCE
JANUARY 1st, 1925

MORRIS HAROLD FRANTZ, 48 East 61st Street, New York City; born in Kiel, Russia, June 10, 1891; graduated from the Homeopathic Medical College, New York City, 1915; elected a Fellow of the Academy December, 1924; died January 19, 1925. Dr. Frantz was a member of the American Society for the Advancement of Science. He was assistant attending neurologist at the City Hospital, attending neurologist at St. Vincent's Hospital, Staten Island, associate neurologist at the Post Graduate Dispensary, and assistant in the dispensary of the Neurological Institute.

WILLIAM MCKAY, 33 East 24th Street, New York City; born in Ontario, Canada, March 7, 1850; graduated in medicine from the University of Toronto, 1878; elected a Fellow of the Academy October 3, 1889; died January 8, 1925.

WALTER M. SILLECK, 445 Park Avenue, New York City; born in New York City, April 15, 1883; graduated from the College of Physicians and Surgeons in 1908; elected a Fellow of the Academy March 6, 1919; died February 15, 1925. Dr. Silleck was a Fellow of the American Medical Association and of the American College of Surgeons. He was associate visiting surgeon at the Post Graduate Medical School and Hospital, and assistant surgeon at the Harlem Hospital.

JOHN W. SMALL, 40 Depeyster Street, North Tarrytown, New York; born in Bowdoinham, Maine, June 5, 1849; graduated from Bowdoin Medical College, Maine, in 1871; elected a Fellow of the Academy January 2, 1890; died February 21, 1925.

WILLIAM E. PORTER, 41 West 73rd Street, New York City; graduated from the College of Physicians and Surgeons, New York City, 1888; elected a Fellow of the Academy December 3, 1891; died March 26, 1925. Dr. Porter was a Fellow of the American Medical Association.

JOHN JAMES COTTER, 204 West 70th Street, New York City; born in New Bedford, Mass., August 3, 1869; graduated from the College of Physicians and Surgeons, New York City, 1898; elected a Fellow of the Academy February 3, 1921; died February 11, 1925. Dr. Cotter was a Fellow of the American Medical Association. He was associate laryngologist at the Hospital for Ruptured and Crippled, and assistant otologist and laryngologist at the Vanderbilt Clinic.

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SIR THOMAS WATSON, 1792-1882
Professor in the University College, London

THE NEW YORK ACADEMY OF MEDICINE

VOL. 1

MARCH, 1925

No. 1

EDITORIAL

In May, 1850, at a stated meeting of the Academy, a resolution was presented by the Committee on Publication recommending that the proceedings of the Academy be published in the form of a bulletin "to appear monthly or otherwise as material may serve, and that the Committee may have power to make the necessary selection." This resolution was adopted and the Committee was instructed to report a plan. Such a plan was discussed at the next stated meeting and decision was made that the Academy issue "a volume of Transactions as more conducive to its interests than a monthly or quarterly bulletin."

On July 3, 1850, it was resolved "that all papers that may be read before the Academy be referred to the appropriate scientific section to report and select such papers as may be deemed worthy of publication."

Publication of the "Transactions" was begun in 1851. Four volumes appeared under this title which contained the transactions of stated meetings and the papers presented for the period 1851 to 1871.

Early in 1859 "the subject of the establishing of a bulletin was agitated and referred to a special committee to inquire into the expediency of it." Thereafter the matter came up at several meetings, indicating that inquiries were being made as to the best way in which to carry on a publication. On February 16, 1860, it was decided that the title of "The Bulletin of The New York Academy of Medicine" be adopted.

Various ways of having the Bulletin printed were considered. It was finally arranged with the New York Journal of Medicine to have the proceedings first published in that Journal, the Journal then to furnish monthly to the Council 750 copies in pamphlet form. This arrangement proved unsatisfactory after the publication of the first number. On June 21, 1860, the Council decided that the Bulletin be published by the Academy, and in 1862 the "Bulletin of The New York Academy of Medicine"

appeared. It was published irregularly in the form of separate pamphlets, the first volume covering proceedings of stated meetings from January, 1860, to October, 1862. The Bulletin went on to 1871, four volumes in all having been published. In that year it was decided that the distinction between the Bulletin and Transactions be abolished and that the matter published be entitled "Transactions of The New York Academy of Medicine."

Thereupon the Academy began the publication of "Transactions, Second Series," in much the same form in which the Bulletin appeared. Up to 1890 each volume covered the stated meetings of a two-year period. Then for five years each volume covered the transactions of a single year. During this time the volumes steadily increased in size, that of 1895 going to 575 pages. However, the next volume, the last of the second series of Transactions, contained but 471 pages, although it covered a period of six years—1896 to 1901.

Dissatisfaction on account of delay in the appearance of papers presented at the meetings appears to have been the main reason for discontinuing publication at that time.

During the past few years the activities of the Academy have so considerably increased that a need has appeared for a medium of expression for the work of the Academy, and through which the Fellows might be advised of the condition of Academy affairs. Accordingly, the Council of the Academy has decided upon the publication of a monthly Bulletin. A Committee on Publication has been appointed, composed of Dr. Charles L. Dana, Chairman, and Drs. Fenwick Beekman, Samuel A. Brown, Charles A. Elsberg, E. Livingston Hunt, Albert R. Lamb, Frederic E. Sondern and George B. Wallace. The Bulletin will be partly educational and partly informative. Lectures, discussions and papers presented at Academy meetings will form a considerable part of the contents of each number. Activities of the Committees will be presented from time to time in the form of papers and reports. The trustees and officers of the Academy will use the Bulletin as the official medium for presenting their reports and recommendations. Announcements of forthcoming meetings and programs and other items of current interest will be made from month to month.

The Bulletin will be known as the "Bulletin of The New York Academy of Medicine, Second Series."

ADDRESS OF THE INCOMING PRESIDENT

LADIES AND GENTLEMEN :

I wish to express to you in assuming the duties of the responsible office to which I have been elected my sincere appreciation of your confidence and your generosity. My predecessor, who has served the Academy for a term of six years, and whose devotion and ability are well known, makes me appreciate more than ever the importance of the duties which you have called upon me to assume. I shall exert my best efforts in the interest of your Academy, and it will be necessary very often to ask for your assistance and generous indulgence. It has been customary in the inaugural address of the President to review the principals for which the Academy stands. The great tripod upon which these principals have been erected is:

1. Cultivation and advancement of the science of medicine.
2. Promotion of the character and honor of the profession.
3. The elevation of the standards of medical education.

These principles always have and always will be adhered to most tenaciously. The character of the scientific program presented during the year attests the first principle. It is hoped in the near future a fixed program committee will assume the responsibility for arranging the scientific part of the Academy activities. The Public Health Committee, under the chairmanship of Dr. Dana, has functioned most ably and has accomplished much work of great importance relating to the community and profession.

Secondly. The promotion of the character and honor of the profession. This principle will be maintained as in the past, upon the highest plane.

Thirdly. Elevation of the standards of medical education. One of the activities of the Academy which will be most extended is the work of the Committee on Education. This committee will be developed and have supervision over postgraduate courses in the city; provide information regarding educational opportunities abroad, locally and in other parts of the country; supply information to our foreign visitors and members of the profession from all parts of the United States and innumerable phases of work relating to education.

It seems to me that it is more appropriate at this time to devote my remarks to the project in which we are all so interested. It has been necessary in the development of the plans of the new Academy for the officers to make many important decisions and I feel that in some instances there have been members who are not entirely familiar with the reasons determining their decisions, and therefore think it might be advisable to present to you as briefly as possible the principal points in the plans as they have been developed up to this time. There are always differences of opinion, and, in fact, differences of opinion and constructive criticisms are most helpful, but misunderstandings often lead to unfair criticisms and lack of unity.

Before taking up the present movement for our new development I am going to ask you to go back with me to the conception of the Academy. As you know, the Academy originated in 1846 through the efforts of a group of pioneers who had vision enough to see the necessity for creating a medical organization independent of the colleges or the medical societies then established. They little knew how well they built or planned, or the rapid development, magnitude and usefulness of this organization in the civic and professional life of this city. It is interesting to note that while the beginning of this Academy occurred in 1846, there is evidence of an attempt to form a similar organization previous to this date, and I quote from an original copy of the N. Y. Medical & Physical Journal, showing that an Academy of Medicine was organized in 1826, preceding our organization by twenty years, with the following officers: Felix Fascalis, president; John B. Beck, John Watts, John Stern and Jos. M. Smith, vice-presidents; Daniel L. M. Peixotto, secretary; Samuel W. Moore, treasurer, and John K. Rogers, curator. This effort apparently never went beyond the organization meeting and the election of officers. I am indebted for this information to Mr. John S. Brownne, who has served the Academy so loyally and faithfully as librarian for many years. I mention this matter as it is of historical interest and I think never before referred to in the history of medicine in New York City. The idea of our Academy was first presented at a dinner of the Society for the Relief of Widows and Orphans of Medical Men. For a number

of years meetings of the society were held in the Lyceum of Natural History and in the building of the University of New York on Washington Square and subsequently at the College of Physicians and Surgeons, 23rd Street. From its very beginning efforts were made to provide it with a building of its own. It was not until 1875 that a building was purchased at 12 West 31st Street. This was sufficient for the needs of the Academy for a number of years, but the demands upon it for meetings and for library purposes soon made necessary the consideration of plans for additional space and efforts were made by friends and the profession to raise funds for a new building. Eventually, in 1890, this building was formally opened. It was thought that the accommodations were ample, but in a period of 15 years it became evident that facilities were entirely inadequate for the purposes and activities that had grown within its organization, and in 1909 committees were again organized to consider how best to relieve the crowding and limitations that existed in the meeting rooms and in the library. After careful consideration additional buildings were purchased to the east of the present building and on 44th Street. It was at this time that the Committee on Plan and Scope succeeded in obtaining from the members of the Academy subscriptions amounting to \$140,000. This was known as the Academy's Extension Fund. After many meetings, deliberation and consideration of plans, it was evident that the utilization of this property would be a very costly experiment and would after all only serve as a makeshift and would in no way solve or make possible the developmental plans and activities of the society. It was a matter of great disappointment to many of our members when it was necessary to give up this plan and to postpone the building of the addition. Yet, in the light of what we know, we can see the evidence of good judgment and forethought exercised by the officers and by the committee. The extension fund was invested and is now available for the purposes for which it was created. It is interesting to note that Dr. Witthaus, one of the staunch supporters of the Academy, was the first subscriber to this fund. It was not until 1923 that the matter was again put in form, when at a stated meeting of the Academy a resolution was adopted authorizing

the president to appoint a Building Committee. It was evident upon deliberate study that a large sum of money would be necessary for this purpose, and a committee under the able direction of Dr. Royal S. Haynes was organized to solicit subscriptions from the members. The efforts of this committee were remarkable in their results. Members and friends responded and liberally contributed the sum of \$531,284.05 for the project. The great response was indeed a remarkable evidence of the interest of the members in their desire to provide greater facilities for this association. Through the efforts of the officers of the Academy the aims and necessities of the situation were placed before the Rockefeller Foundation with the result that the sum of \$1,250,000 was appropriated by the Foundation for endowment and extension of the Academy activities. The Carnegie Corporation, as an evidence of their desire to help the medical profession, also offered to appropriate for a new building the sum of \$1,000,000 subject to their approval of the site and the plans for the building. We are greatly indebted to Dr. Pritchett for his personal interest, as it was largely due to his efforts that the Corporation became interested. The officers of the Academy have appealed to the Carnegie Corporation for an additional sum of \$550,000 for building purposes and have every reason to believe that their efforts will meet with success. Certain generous donors, among them Mrs. Helen Hartley Jenkins, Mr. Edward S. Harkness, Mr. George F. Baker and Mr. James B. Ford for the estate of Dr. Everett Herrick, subscribed toward the purchase of the new plot and it seemed as though all obstacles had been overcome which would in any way prevent the immediate erection of a new building. After a careful study of available properties a site was purchased at Park Avenue and 60th Street for the sum of \$754,500 and work was at once begun upon drawings and plans for the erection of the building. Further consideration on the part of the officers of the Academy soon evidenced the fact that there were many objections to the site selected, among them that the corner of 60th Street and Park Avenue was very little better in respect to congestion than the site in 43rd Street, that the amount of money which had been placed in the property was in excess of the sum that the Academy could afford to invest and that it would

have been necessary in some way to materially reduce the scope of the contemplated plans or obtain an additional \$1,000,000 for building and \$2,000,000 for endowment before the project could be consummated. Fortunately, before any serious contracts or obligations had been undertaken, an opportunity presented itself to dispose of this property at a profit, which, in view of the above objections, left no alternative but to accept it and to locate upon another site with a better understanding of the financial requirements necessary to make the undertaking a success. Once again it was a question of hunting a suitable site upon which to erect a home. Many locations were investigated and their advantages and disadvantages discussed, and eventually a property on the corner of 103rd Street and Fifth Avenue was, after a unanimous vote of the Academy, purchased by the trustees. There has been a considerable criticism about the selection of this property, principally because of its geographical location, but I think that with all the facts before you, you will agree that it was a wise and proper selection on the part of your officers. First, from its position opposite the park, perpetual light was assured; second, it was in a district that would permit an easy approach and was free from many of the disadvantages of traffic; third, the property was almost double the size of the one at 60th Street, being 175 feet by 100 feet as compared with 100 by 100 in the former location; fourth, it was possible to purchase this property for the sum of \$225,000, thus making available for endowment and equipment the sum of \$613,000 which had been invested at 60th Street; fifth, with the moneys appropriated by the Rockefeller Foundation, the gift of the Carnegie Corporation, the generous gifts of friends of the Academy, subscribed by members, equity in the 43rd Street property and other assets of the Academy, all go to make practicable the erection of a building and the provision for an endowment which will care for the activities as contemplated in the development of our proposed expansion. Otherwise the present plans would have been delayed indefinitely by reason of the necessity for raising more money. The objections to the site as presented by some of the members were that it was too far uptown and not easily accessible. This, at first sight, seems a fair criticism, yet when we study the rapid growth

and development of New York, who can predict what changes will occur in this vicinity within the next ten years? It is readily reached by the transportation lines on Lexington and Madison Avenues, both surface and subway, with a station at 103rd Street; by the Fifth Avenue buses, a street available for motor transportation, and is also within reasonable distance of cross-town lines. Therefore, it does not seem that there is the slightest question but that the decision of the Academy and your officers was a judicious and proper one. There will be erected on this site a building which will be a monument to the generosity of the Carnegie Corporation, Rockefeller Foundation, the profession and friends of the profession, that will amply house all of the activities of the Academy now organized or to be organized and provide meeting rooms for the Academy, associated societies, the Public Health Committee, the Education Committee, a library ample in size to accommodate 327,000 volumes and provisions for future expansion, and many other lines of work now under consideration and contemplated by the trustees and council.

Let us for a moment make an inventory of our future possibilities. If we obtain the additional appropriation for building we will come into possession of a building costing one million and a half, the gift of the Carnegie Corporation, equipped at an expense of about \$175,000 by the Academy on a plot costing \$225,000 provided by generous friends, and would have for endowment, including the Rockefeller Foundation gift, a sum approximating two and a half millions. This estimate must necessarily be approximate because the equity in the 43rd Street property cannot be determined until a sale has been made, and until the Carnegie Corporation has arrived at a definite decision.

We therefore must, I think, be congratulated upon the consummation or practical consummation of plans for which we all have been striving these many years, and it is my hope that the understanding of these facts will bring about a closer relationship between the officers and the members of the Academy. Dr. Duel, who as chairman of the Building Committee has devoted a great deal of time to the study of the plans, will make a detailed report a little later.

In conclusion, I must beg your indulgence and become somewhat personal. The retiring president, Dr. George D. Stewart, who has guided the destinies of the Academy with the assistance of the trustees and council for six years, and who during that time has been called upon to decide many momentous and serious questions of policy, has given much of himself in order that we might benefit, and if, during my incumbency of office, we will be privileged to see the erection of a new building, it would seem to me but fair to state that anything that we may accomplish will be but the completion of the plans which he and his associates have so carefully developed, and for which we all, as members, are deeply indebted.

REPORT OF THE BOARD OF TRUSTEES

TO THE FELLOWS OF THE NEW YORK ACADEMY OF MEDICINE:

During the year 1924 the Board of Trustees has held eight regular meetings and in addition seventeen special meetings. During the winter of 1924 a large amount of time was given to the finances of the Academy, especially in regard to the proposed new building. The plans for the proposed building at 60th Street and Park Avenue called for an expenditure of over \$2,000,000. The Carnegie Corporation, which had already appropriated \$1,000,000, did not feel able to increase its appropriation sufficiently to construct a building of the type called for. A re-study of the needs of the Academy was made and although it was found that a smaller building could be constructed on the 60th Street site, it was considered more desirable to secure if possible a larger plot and at a considerable less expense than the one at 60th Street. The 60th Street plot had been bought by the Academy for \$754,500, upon which were unpaid mortgages, amounting to \$141,000. The Trustees finally decided that the wiser solution of the problem was to sell the 60th Street plot, and recommended this procedure to the Fellows of the Academy, which recommendation was unanimously approved by the Fellows present and voting at a stated meeting held on May 1, 1924. This property was finally sold for the sum of \$1,000,000—\$500,000 of which has already been paid. The balance remains in a

mortgage on the property, which is steadily increasing in value as a building is now being constructed on the plot.

Before the 60th Street property was sold the Trustees made a most careful search of all properties in the city which seemed available for the Academy needs. Such sites are not easily obtained and over one hundred were considered and studied before the Trustees finally determined that the lot at 103rd Street and Fifth Avenue was suitable to the Academy needs and the Academy approved of the acquisition of this site, which was finally purchased for \$225,000. The Trustees feel that the Academy is very fortunate in having made this change, as a number of the Board were quite fearful of the enormously increased expenditure for maintenance which will naturally result when the Academy is installed in a new building. Although it is known that a number of the Fellows of the Academy feel that this site is somewhat inaccessible, the Trustees are convinced that this decision will be for the best interests of the Academy. The difference in the cost of the land will enable the Academy to add to its endowment, which will materially aid in the maintenance of our new building and new activities.

The Trustees decided during the year to change the fiscal year of the Academy, which has been from November 1 to October 31, to the calendar year, January 1 to December 31. A number of years ago the fiscal year was changed so that financial reports could be prepared in time to present them to the Academy at its January meeting. It is now found that by a rearrangement of the work it will be possible to present such reports in January even if the fiscal year is the same as the calendar year.

The income and expenditures of the Academy will be given in detail in the report of the Treasurer, but attention is called to the fact that the total receipts of the Academy for the fourteen months ending December 31 amounted to \$149,431.31 and the expenditures amounted to \$155,523.02, leaving a deficit of \$6,091.71. We owe to restricted funds \$20,159.85, leaving an actual deficit at the end of the thirteen months of \$26,251.56.

At the present time the funds of the Academy as invested in the General Permanent Fund, the Endowment Fund, the Library and other restricted funds are as follows: There are invested in

first mortgages on New York City real estate \$898,500, in bonds of a par value \$550; and in the real estate of the Academy at 17, 19 and 21 West 43rd Street, 103rd Street and Fifth Avenue, and at 222 East 83rd Street, \$616,926.59.

There have been a few changes in staff during the past year, the most important of which has been the appointment of a Director who is giving an increasing amount of his time to Academy affairs and in particular to the plans for the construction of the new building. The work of the Librarian and his staff and that of the various employees in the building has been most satisfactorily performed throughout the year.

CHARLES L. DANA, *Chairman*

ABSTRACT OF THE TREASURER'S REPORT FOR 14 MONTHS ENDING DEC. 31, 1924

ASSETS AND LIABILITIES

Assets

Cash in Banks:

Income of Funds	\$ 1,691.56
Principal of Funds	17,008.06

18,699.62

Cash in Office	10.00
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Investments:

Bonds and Mortgages	899,050.00
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Real Estate:

17-19-21 W. 43rd St.	284,426.59
15 W. 43rd St.	100,000.00
222 E. 83rd St.	7,500.00
5th Ave.-103rd St.	227,548.58

619,475.17

Library	80,000.00
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Estate of Dr. Charles A. Powers	1,513.98
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1,618,748.77

Liabilities

Principals of Trust Funds	894,291.27
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Principals of Other Funds:

Academy Extension Fund	133,908.88
New Site Fund	495,096.55

629,005.43

Mortgages, 17 West 43rd Street	100,000.00
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Prepaid Dues	30.00
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1,623,326.70

Less deficit:

Unexpended Income, Library	1,701.63
“ “ Special Fds.	18,458.22

20,159.85

Less Academy Deficit	24,737.78
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4,577.93

SUMMARY OF ANNUAL STATEMENT

Income

Unrestricted	\$	56,629.83	
Restricted:			
Petty Cash		10.00	
Holt Tablet Fund		596.64	
			\$ 57,236.47
Carnegie Architects'			13,021.55
Library Funds			14,429.38
Public Health Committee			15,849.03
Rockefeller Appropriations:			
Direction			11,377.95
Survey, etc.			5,000.00
Bureau of Information		11,592.08	
Carnegie (Med. Educ. Soc.)		15,186.00	
Bulletins		1,319.25	
			28,097.33
Carpenter Lectureship Fund			361.65
Gibbs Prize Fund			3,161.85
Loomis Entertainment Fund			896.10
Charles A. Powers Legacy			
			\$ 149,431.31

Expenditures

Operation, Administration, Corporation Expense	\$	60,631.35	
Architects' Fees		13,021.55	
Library		34,070.45	
Public Health		15,849.03	
Direction		8,787.75	
Survey		2,914.47	
Committee on Medical Education, Bureau of Clinical Information		15,261.97	
1924 Lecture		312.15	
Gibbs Fund (Transferred to principal)		2,445.32	
Collations		715.00	
Inheritance Tax		1,513.98	
			\$ 155,523.02
Expenditures		155,523.02	
Income		149,431.31	
			\$ 6,091.71

Owed to Restricted Funds:

Rockefeller Revolving Fund	\$	2,590.20	
" Survey Fund		2,085.53	
Carnegie Med. Educ. Fund		12,835.36	
Gibbs Prize Fund		716.53	
Carpenter Lectureship Fund		49.50	
Loomis Entertainment Fund		181.10	
Library Funds, unexpended income		1,701.63	
			20,159.85

	\$	26,251.56	
Less prepaid on Powers Legacy		1,513.98	

DEFICIT \$ 24,737.58

SETH M. MILLIKEN,
Treasurer.

OXYGEN THERAPY IN PNEUMONIA

CARL A. L. BINGER

(From the Hospital of the Rockefeller Institute for Medical Research, New York, N. Y.)

It is extraordinarily difficult to establish the efficacy of a therapeutic agent. If this is true of a specific chemical or serological substance it is even more so of a drug like oxygen in pneumonia which is used essentially as a supportive measure and not as a direct attack on the infecting organism. There are, in general, two methods of approach to a problem of this sort—one a statistical, two an experimental one. It should be stated at the outset that we have at present nothing to contribute to the first. Because of the complexity of the material and the difficulties involved in its analysis, it is quite impossible now, and probably will be for many years, to acquire any definite information about the value of oxygen on a statistical basis. We are, however, now in a position to state certain facts about the therapeutic value of oxygen from an experimental and physiological point of view and to provide an adequate rationale for its use.

For a more intelligent understanding of this subject we should consider first its history and secondly the normal physiological transport of oxygen in the body. In general the therapeutic use of oxygen may be divided into three periods. First a *Period of Naïve Enthusiasm* which immediately followed the discovery of oxygen by Priestley in 1774 when oxygen was hailed as a panacea. It was, of course, a very romantic idea to have separated from the air its life-sustaining principle and accordingly oxygen inhalations were used for almost every conceivable malady from hysteria to bubonic plague and in almost every conceivable form—even in the form of oxygenated bread, which became a therapeutic fad. But the oxygen bubble burst. After fifty years or more of hopes deferred, we enter on the second period, which we may designate as the *Period of Dogmatic Denial*. It is in this period that most of us were educated. Now the reasons for the change of heart are apparent. Physiological research showed that arterial blood normally carries nearly its maximum load of oxygen, and that increasing the oxygen concentration of the

inspired air does not result in increased metabolic activity. It was natural to conclude from this that if the blood were already saturated with oxygen and if increasing the oxygen in the air breathed did not augment the oxygen consumed there was nothing to be gained from oxygen administration. But a more telling reason for the increasing disrepute into which oxygen therapy had fallen was the wholly inadequate methods used for its administration. We are all acquainted with the familiar scene: the moribund patient with a "death rattle" in his throat, the hurried call for an oxygen cylinder, and the funnel held over the dying man's face. And yet I venture to say that none of us has ever seen this do any good and we have all been more or less conscious of trying to bolster up the courage of the relatives rather than of hoping for any real benefit to the patient. As has been well said we might as well administer tincture of digitalis by spraying the drug in an atomizer as giving oxygen by holding a funnel several inches away from a patient's nose and mouth. To administer oxygen effectively we must raise the partial pressure of the gas in the patient's alveolar air and this should be done, as far as is practicable, quantitatively as with any other drug.

This brings us to the third period in the history of oxygen therapy—the *Period of Experimental Skepticism* on which we may reasonably say we are now well embarked. But let us consider first the means by which oxygen is normally transported in the body. Normal human blood contains about 15 grams of hemoglobin per hundred cc. This is sufficient to combine chemically with 20 cc. of oxygen. The blood may contain approximately 20 cc. of oxygen per hundred cc., or 20 volumes per cent. when it is saturated. This represents its oxygen-carrying capacity and when it contains its maximum load we speak of the blood as being 100 per cent. saturated. Now the blood in the arteries is almost completely saturated, containing instead of 20 volumes per cent. from 18 to 19. It is, therefore, normally from 95 to 98 per cent. saturated with oxygen. In its passage through the tissues the blood loses approximately 5 volumes per cent. and we find the venous blood therefore containing about 13 volumes per cent. This matter may be expressed in a slightly

different way. The arterial blood, which, we have said, contains approximately 19 volumes per cent., differs from the blood when completely saturated by one volume per cent. It may therefore be said to have one volume per cent. of oxygen unsaturation and similarly the venous blood would have 7 volumes per cent. of unsaturation. If we assume that the blood in the capillaries is a mean between the arterial and the venous blood in its oxygen content, its unsaturation can be expressed thus

$$C = \frac{1 + 7}{2} = 4$$

In other words, the capillary blood has an unsaturation of 4 volumes per cent. Lundsgaard and Van Slyke have shown that under ordinary circumstances, especially when there is no anemia present, clinical cyanosis appears when the capillary unsaturation has reached a level of 6 volumes per cent. or over. It is important to remember that the cyanotic color depends primarily upon the absolute concentration of reduced hemoglobin in the capillary blood and that for this reason the concomitant occurrence of anemia may prevent the appearance of cyanosis even in the presence of oxygen want.

From a clinical point of view cyanosis is certainly one of the outstanding features of oxygen want. We know now that oxygen want may bring on even in the normal human subject a trend of serious and distressing symptoms. These may be acute in onset when the subject is suddenly exposed to atmospheres with low partial pressure of oxygen, or they may be chronic. From the point of view of oxygen want as it occurs in a disease like pneumonia, we are interested chiefly in the acute variety.

A few years ago I had the privilege of taking part in a physiological expedition to the Peruvian Andes for the purpose of investigating the effect of high altitudes on the human organism. In the company of Doctor Alfred Redfield I left Lima, which is at sea level, at about eight o'clock in the morning and within six hours we had crossed the continental water-shed at Tielio at an altitude of some 15,000 feet. At this point a wash-out on the railroad necessitated our getting out of the train and walking approximately 200 yards to another train. I can best describe my own sensations by saying that I felt like an octogenarian

who had spent a winter's night on a hard park bench and been suddenly aroused by a hit on the head with a policeman's night stick. There was intense occipital and frontal headache, palpitation, precordial pain, rapid breathing, nausea, and a great sense of depression. The other members of the expedition experienced the same effects and the symptoms, including sleeplessness, visual disturbances, vertigo, and in some instances, elevation of temperature continued for several days. And yet all these symptoms were brought on, in my own instance, by a reduction of the percentage saturation of my arterial blood from 95 to 84. If we examine the dissociation curve of oxyhemoglobin which represents the manner in which hemoglobin combines with oxygen when subjected to increasing partial pressures of oxygen, we will see that a change such as I have just described was brought on by a fall in the tension of oxygen of the alveolar air of approximately 50 mm. Now the object of all this is simply to show you what a profound series of untoward symptoms can be brought about by reducing the pressure of oxygen in the blood of a normal human being. And yet the great majority of patients with lobar pneumonia suffer from just such a reduction of oxygen pressure. Now we frequently see a percentage saturation very much lower than the one I have cited. Stadie showed, in a series of 33 pneumonia patients, that none recovered whose arterial saturation was below 70 per cent. If we consider that the patient with pneumonia has to fight a severe, progressing infection with its associated toxemia, it is perfectly clear that the added disadvantage of anoxemia may be such as to overcome him. And it becomes perfectly apparent that it is to his advantage to save him from the extra burden on his cardio-respiratory and central nervous systems which anoxemia involves.

That this can be done can be shown by observations made on the arterial blood of pneumonia patients before and after oxygen therapy in which we see in every instance an increase in the percentage saturation, often restoring it to the normal level.

I shall not discuss at length the various causes of anoxemia in pneumonia but simply emphasize once more its existence, its importance from a physiological point of view, and the fact that it frequently can be remedied by proper, early, and continuous administration of oxygen.

This brings us to a brief discussion of the various methods available. The essential of a good method is one which, with the least disturbance to the patient, will raise the concentration of oxygen in the inspired air to a desired and preferably a known level. There are several such methods now available. None of them is perfect but any one of them is better than the old funnel method, and in spite of disadvantages should be used. Of the three portable methods the best are those of Haldane and Yandell Henderson in which the patient breathes oxygen through a mask from a bag into which the gas is discharged at a known rate; and the one of Barach in which the patient breathes through a mouth-piece into a bag—provision being made for continuous removal of carbon dioxide. It is often very difficult in seriously sick, delirious patients, to apply successfully a method requiring the use of either a mask or a mouth-piece. Recently Leonard Hill and also Roth, of the Battle Creek Sanitarium, have described tents which fit over the bed in which the atmosphere can be raised to a desired level of oxygen. I have had no personal experience with either of these methods. Doctor Barach has devised a somewhat improved variety of tent which he is now using at the Presbyterian Hospital.

Of course the ideal method is the oxygen chamber and we are fortunate enough to have such a chamber at the Hospital of the Rockefeller Institute. The chamber consists of an air-tight, fire-proof room 10 x 10 x 8 feet in dimensions with a vestibule which allows passage into and out of the chamber with the minimum loss of oxygen and a ventilation system which provides for cooling and drying the air and scrubbing it free from carbon dioxide. The chief advantage of the chamber method is that it permits of adequate and unhampered nursing care and in a disease like pneumonia we are all aware of the great importance of good nursing. Furthermore, it permits us to make physiological observations on the patient throughout the course of the disease. It is our practice to take blood from an artery before putting the patient in the chamber and then to raise the oxygen in the atmospheric air sufficiently to overcome the existing anoxemia. This fact we determine by a second arterial puncture. In our experience 40 per cent. oxygen, or approximately

twice the normal atmospheric concentration, is sufficient to raise the blood to as near normal as it can be. If 40 per cent. does not do this it is unlikely that a higher percentage will. The chamber method has given us facilities for putting the use of oxygen on a precise and quantitative basis and it is our opinion that this is as essential here as with the use of any other drug.

RATIONALE OF THE SPECIFIC TREATMENT OF LOBAR PNEUMONIA

RUSSELL L. CECIL

What are the reasons for administering specific serum in lobar pneumonia? What theoretical or practical evidence have we of its efficacy in controlling pneumococcus infections of the lungs? In order to answer these questions properly it will be necessary for us to go back and review briefly the history of the development of anti-pneumococcus serum and the more recent derivatives from it.

Years ago Neufeld showed that animals vaccinated with pneumococcus cultures, killed or living, developed an immunity against the organism. This fact has been amply verified by other investigators, more recently by Cecil and Steffen, who found that monkeys vaccinated against pneumococcus were immune to pneumococcus pneumonia. Cecil and Blake noted that a similar immunity to pneumonia existed in monkeys that had recently recovered from the disease.

Pneumococcus immunity is probably dependent upon a number of factors—agglutinins, precipitins, opsonins, etc., but the most conspicuous and probably the most important of these immune substances are the so-called protective bodies. The “protective bodies” (or the “protective substance”) receive their name from the fact that mice, when they are injected with virulent pneumococci, may be protected from death by the simultaneous injection of a certain amount of anti-pneumococcus serum. This protective substance in anti-pneumococcus serum has never been isolated in a chemically pure form, but it can be

removed from serum as we shall see later. Dochez found that patients recovering from lobar pneumonia developed protective bodies against the pneumococcus about the time of crisis. He inferred, therefore that they played a significant part in pneumococcus immunity.

The next important step in the study of pneumococcus immunity was the differentiation of the four types of pneumococcus. This classification was started by Neufeld and developed to its present state by Dochez and Gillespie. Cole made a great step in advance in the specific treatment of pneumonia when he introduced Type I anti-pneumococcus serum. Cole also worked with Type II serum, but the results were inconclusive. The effect, however, of Type I serum on patients with Type I pneumonia was very striking, producing in many instances a rapid drop of temperature, and sterilizing the blood in cases with pneumococcus septicaemia. Furthermore, the mortality statistics based on cases of Type I pneumonia treated at the Hospital of the Rockefeller Institute were very encouraging. Cecil and Blake showed that monkeys infected with fatal Type I pneumonia could in every case be saved by the intravenous injection of Type I anti-pneumococcus serum. The temperature rapidly dropped to normal and pneumococci disappeared from the blood. Bull found that rabbits with pneumococcus Type I septicaemia could be saved by the intravenous injection of Type I anti-pneumococcus serum. The pneumococci in the blood stream were agglutinated and caught in the lymphatic spaces of the liver and spleen where they underwent phagocytosis. Blake and others have found that when virulent pneumococci are grown in anti-pneumococcus serum they lose much or all of their virulence. Apparently this is one of the chief functions of the protective substance, namely, to deprive the pneumococcus of its virulence. Neufeld showed years ago that the phagocytes will not take up virulent pneumococci; only avirulent strains are subject to phagocytosis.

While the body is producing protective bodies to defend itself against the pneumococcus, the pneumococcus in its turn is producing a peculiar substance, called by Avery the S substance, the function of which is presumably to protect the pneumococcus.

It has the power of neutralizing the protective substance and in this way probably prevents phagocytosis of the invading pneumococci. This S substance is not toxic in the ordinary sense of the word, but by interfering with the immune mechanism gives the pneumococcus greater opportunity for attacking the host.

From this discussion we may discern the more important functions of the protective substance. They are:

1. To remove pneumococci from the circulating blood.
2. To render pneumococci avirulent and therefore susceptible to phagocytosis.
3. To neutralize the soluble substance which is the protective weapon of the pneumococcus.

The object, therefore, of specific therapy in pneumonia is to supply the patient as early in the disease as possible with an abundance of protective substance. The patient is simultaneously manufacturing his own protective bodies, but at a rate perhaps, insufficient to meet the demand.

During the past four years we have been studying the action of various pneumococcus antibody solutions in the wards and laboratories of Bellevue Hospital. Most of the investigations have been conducted with Huntoon's pneumococcus antibody solution, but more recently we have also been experimenting with Felton's concentrated anti-pneumococcus serum. Daily blood cultures have been taken on many of our cases, and the relation of pneumococcus septicaemia to prognosis has been studied. We have also been interested in the effect of protective substance on pneumococcus septicaemia.

In 37 cases of pneumococcus pneumonia with positive blood cultures, 29 died, a death rate of 78.3 per cent. In contrast to this heavy mortality 70 cases with sterile blood cultures showed a mortality of only 10.0 per cent. It is clear, therefore, that when pneumococci get into the blood the prognosis is much more serious than when infection remains localized in the lungs.

We have corroborated the findings of Dochez, namely, that in untreated cases of pneumococcus pneumonia the protective substance is apt to make its appearance in the blood at about the time of crisis. If the protective substance does not make its appearance the patient develops septicaemia and death follows.

In 5 cases that showed no protective bodies at any time in the course of the disease all five died. When protective substance is administered to the patient in the form of pneumococcus antibody solution, the protective bodies usually appear in the circulating blood earlier in the disease. With rare exceptions it does not appear in the blood as long as the patient has a pneumococcaemia. As stated above, however, the protective substance usually drives the pneumococci from the blood, especially in Type I cases. In other types it is more difficult to sterilize the blood once septicaemia has developed, but if treatment is started early the protective substance may act as a prophylactic against pneumococcus septicaemia.

Occasionally the blood is sterilized in pneumonia, but the patient dies of anoxaemia or heart failure. This, however, is very unusual. Sterile blood in pneumonia usually means recovery.

Huntoon's pneumococcus antibody solution as originally prepared often produced foreign protein reactions when administered intravenously. We have tried the effect of subcutaneous injections of antibody solutions, but have found that when antibody is injected subcutaneously a considerable part of the protective substance is blocked in the subcutaneous tissue and never enters the circulation. Some cases treated early appeared to be benefited by subcutaneous treatment, but altogether the results were rather disappointing. More recently Huntoon has been able to produce antibody solution which causes no reaction when injected intravenously. We now have a series of 15 cases treated intravenously without the occurrence of chills. Similar results have been obtained in other institutions.

We have tested Felton's concentrated anti-pneumococcus serum on about 75 patients. The treatment has always been by the intravenous route. Approximately 10 per cent. of the patients treated have had chills following the injections. This is a disadvantage which probably can be eliminated. Felton's serum produces striking drops in temperature in many of the Type I cases. In other types our experience has been too limited to justify any conclusions.

It is very unfortunate that so few pneumonias are admitted to our city hospitals during the early days of the disease. Dur-

ing four years study of specific therapy in pneumonia in the wards of Bellevue Hospital we have been able to treat only 163 cases of pneumococcus pneumonia during the first 48 hours of the disease. In this series of 163 cases, all of which were treated either intravenously or subcutaneously with Huntoon's pneumococcus antibody solution, the death rate was 14.1 per cent. In 210 control cases admitted to the hospital during the first 48 hours of the disease the death rate was 29.0 per cent. This is a comparatively small group on which to base conclusions, but a cut of one-half in the death rate for treated cases is certainly significant.

At the present time there are three specific products on the market for the treatment of pneumococcus pneumonia:

1. The Type I anti-pneumococcus serum of Cole.
2. Huntoon's pneumococcus antibody solution.
3. Felton's concentrated anti-pneumococcus serum.

The first is applicable for Type I cases only. The last is prepared now for both Type I and Type II cases. Huntoon's antibody solution is polyvalent, containing protective bodies against Types I, II, and III. Its potency against Type II, however, is considerably less than against Type I, and its potency against Type III is even smaller. The advantage of Huntoon's antibody solution lies in the fact that it contains no horse protein and is, therefore, incapable of causing anaphylactic shock or serum sickness. Felton's solution contains very little horse protein; indeed, the amount is so small that it seldom if ever causes serum sickness. Enough protein is present, however, to induce symptoms of anaphylaxis in a highly sensitive person. Huntoon's solution is, therefore, preferable to Felton's in respect to protein content. On the other hand Felton's solution has the advantage of being more potent in protective substance than either the original Type I serum or Huntoon's antibody solution.

Finally I wish to emphasize that the chief function of anti-pneumococcus serums of all kinds is to prevent pneumococcus septicaemia or to cure it. It is much easier to achieve the former than the latter. The importance, therefore, of early treatment must be apparent to all. The more concentrated the product the more efficient will be the treatment. The efforts now being made

to purify and concentrate anti-pneumococcus serum are in line with the purification of various pharmaceutical and biological products, a field of research in which there have been important advances during the past few years. In view of the very beneficent effect which the protective substance produces on pneumococcus infections it is not unreasonable to believe that the solution of the pneumonia problem is not far distant. Almost every day new knowledge is being added to the subject and even now agents are available which are undoubtedly of value in controlling the commoner types of pneumococcus pneumonia.

ANNOUNCEMENTS

THE Committee on Publication is instructed to announce that the Academy does not hold itself responsible for the facts or opinions set forth in any of the papers contained in its printed transactions.

COLONEL FIELDING H. GARRISON, Librarian of the Surgeon General's Office at Washington, D. C., has accepted the position of consulting librarian of the Academy. Arrangements have been made for Colonel Garrison to make regular visits to New York in order that his services may be available to the Fellows of the Academy desiring assistance in Bibliography, preparation of papers requiring research, criticism, revision or reduction of manuscript for the press, etc.

AT the stated meeting held January 15, the Fellows of the Academy voted to increase the number of trustees from five to ten. The new trustees elected at the stated meeting held March 5 are as follows:

Royal S. Haynes to serve five years until Dec. 31, 1929.

James A. Miller to serve four years until Dec. 31, 1928.

George B. Wallace to serve three years until Dec. 31, 1927.

Fordyce B. St. John to serve two years until Dec. 31, 1926.

Eugene H. Pool to serve one year until Dec. 31, 1925.

DR. OLIVER WENDELL HOLMES AND HIS POEMS

When I was a medical student there was circulated amongst us a poem by Oliver Wendell Holmes written evidently to be read before some private medical society; it was witty and interesting, but it had some anatomical references that evidently made it unwise to have it published. However, I was so much interested in the poem that I wrote to Dr. Holmes asking permission to have one copy privately printed for my own use. He replied that he did not wish this done and urged me to send my copy to him. I did not do this but simply tore the poem up. The incident, however, got me interested in Dr. Holmes' career, and particularly in his poetry. This interest was increased by the fact that about this time the profession of New York invited Dr. Holmes to come to this city and attend a dinner to be given in his honor. He did this and I was present at the dinner, and for the first time in my life heard a real poet read his own real poetry. Dr. Holmes read his verses in an inimitable style which very much thrilled me. The occasion altogether was very impressive to me, for all the medical and surgical celebrities of the city were there. The speeches and poetry were subsequently published in a volume which is included amongst those that I have presented to the Academy.

Some impulse stirred me after this to collect the first editions of the poems of Oliver Wendell Holmes. My interest was increased by finding so much of associated history in the various and unique publications in which they appeared.

Dr. Holmes was essentially a poet of occasion and especially of the occasions commemorative of historical events or of important historical characters. One cannot go over the several volumes in the collection without learning much of the history of New England and its important men. Dr. Holmes was not a great poet, though he did write a few great poems. And he never wrote poetry that was dull or bad. He was not and did not pretend to be a great physician or anatomist, but he did make a definite and extremely important contribution to clinical and preventive medicine when he came out in his paper on the septic theory of puerperal fever; and as a teacher and writer he made real contributions to education and literature. The history of American medicine will always have to tell something of the story of his life and his career.

CHARLES L. DANA

A COLLECTION OF THE FIRST EDITIONS OF THE POEMS OF OLIVER WENDELL HOLMES

PRESENTED TO THE LIBRARY BY DR. CHARLES L. DANA

The harbinger; a May gift. Boston. 1833.

Terpsichore. Phila. 1844.

Poem: "Come back to your mother, ye children, for shame,"
read at Berkshire jubilee, August, 1844. Albany. 1845.

Poems. London. 1846.

Urania: a rhymed lesson . . . pronounced before the Mercantile Library Association, October 14, 1846. 2nd edition. Boston. 1846.

Poem . . . delivered at the dedication of the Pittsfield cemetery, September 9, 1850. Pittsfield. 1850.

Astraea: the balance of illusions. A poem delivered before the Phi Beta Kappa Society of Yale College, August 14, 1850. 1st edition. Boston. 1850.

Response . . . at an entertainment given to the American Medical Association by the physicians of the City of New York . . . 5th of May, 1853. . . . A poem. N. Y. 1853.

Oration at the semi-centennial celebration of the New England Society, in the City of New York, December, 1855. Also poem: Lines to New England. N. Y. 1856.

Poem in memory of Daniel Webster. Boston. 1856.

Tribute to his friend, classmate and pastor, James Freeman Clarke, at the commemoration of the fiftieth birthday of J. F. C. 1st edition. Boston. 1860.

Vive la France! A sentiment offered at the dinner to H. I. H., the prince Napoleon, at the Revere House, Sept. 25, 1861. Cambridge. 1861.

Songs in many keys. Boston. 1862.

Poem read at a reception and entertainment to the Chinese embassy by the City of Boston, 1868. Boston. 1868.

Hymn in memory of Charles Sumner. Boston. 1874.

A ballad of the Boston tea party. Boston. 1874.

Grandmother's story of Bunker Hill battle as she saw it from the belfry. Boston. 1875.

- The school-boy. . . . With illustrations. Boston. 1879.
 The iron gate, and other poems. Boston. 1880.
 Benjamin Pierce, astronomer, mathematician. 1809-1890. Poem.
 From the Atlantic Monthly. Cambridge. 1881.
 Proceedings at the dinner given by the medical profession of the
 City of New York, April 12, 1883, to Oliver Wendell Holmes,
 M.D., LL.D. N. Y. 1883.
 A welcome to Dr. Benjamin Apthorp Gould. Poem. Lynn.
 1885.
 Before the curfew and other poems, chiefly occasional. 1st edi-
 tion of collection. Boston & N. Y. 1888.
 Poem in memory of Francis Parkman read before the Massachu-
 setts Historical Society, November 21, 1893. Boston. 1893.
 The last leaf. Poem. . . . Illustrated by George Wharton
 Edwards and F. Hopkinson Smith. Cambridge. 1895.

ARTISTIC PORTRAITS OF PHYSICIANS

In olden days, and more especially in the 18th and early 19th centuries, successful physicians had their portraits painted and engravings or mezzotints made from these for distribution and sale. It was before the day of photographs. These reproductions were usually done by good artists; and the portraits are on sale in New York now just because of their artistic value. My interest in collecting portraits of physicians during the last twenty years led me to get all that I could find of this class of portraiture. Naturally it included many distinguished names, such as those of Jenner, Hunter, Haslam, Boerhaave, Piteairn, Abernethy; but also many that are unfamiliar. The names of the artists will be recognized only by those who have spent time on woodcuts, steel and mezzotint engravings; the list includes—*e.g.*, Masson, Nanteuill, Sharp, Jones, Marshal, Faithorne and Edelinck. It may interest some of the Fellows of the Academy to feel that they are seeing something of art while getting portraiture-suggestions of medical history.

Some of the older Fellows may remember that Sir Thomas Watson wrote a text-book on medicine which was famous for its literary quality and descriptive excellence. The engraving of Sir Thomas in my collection is, as was his book, a masterpiece of personal and artistic interest.

CHARLES L. DANA

THE COLLECTION OF PORTRAITS

PRESENTED TO THE ACADEMY BY DR. CHARLES L. DANA

- | | |
|--|--|
| Sir William Burnett (mezzotint) | Jacob de Castro Sermento (mezzotint) 2 |
| John Anthony (engraving) | Henry de Grandjean (engraving) |
| Joshua Brooks (engraving) | Robert Gooch (engraving) |
| Theodore Craanen (engraving) | Thomas Gill (mezzotint) |
| Sir William Blizard (mezzotint) | James Johnstone, jr. (etching) |
| Conrad Hieronymus Eberhard (mezzotint) | Robert Cony (mezzotint) |
| George Eberhard Rumpf (engraving) | Sir Charles Mansfield Clarke (mezzotint) |
| K. B. Reichert (lithograph) | Francis Chicoyneau (engraving) |
| Giovanni Rasori (lithograph) | Carl Gustav Carus (lithograph) |
| Thomas Garnett (lithograph) | J. C. Carpue (mezzotint) |
| Hieronymus David Gaub (engraving) | J. Hatton (mezzotint) |
| Thomas Glass (mezzotint) | Sir Edward Hulse (mezzotint) |
| Joh. Jacob Baier (engraving) | Sir Everard Home (engraving) |
| Thaddeus Bayer (engraving) | David van Hoogstraten (engraving) |
| Dr. Bethune (?) (lithograph) | John Hill (mezzotint) |
| Samuel De Lion Benavente (mezzotint) | Joannes Heurnius (engraving) |
| John Andrews (mezzotint) | William Henry (mezzotint) |
| William Bromfield (mezzotint) | Richard Clement Headington (mezzotint) |
| Sir B. C. Brodie (mezzotint) | Busiek Harwood (mezzotint) |
| Joseph Brandreth (engraving) | John Haighton (lithograph) |
| Joseph Brown (mezzotint) | George J. Guthrie (mezzotint) |
| William Browne (mezzotint) | John Grosvenor (mezzotint) |
| A. M. Braun (lithograph) | Richard Grindall (mezzotint) |
| Sir James Earle (mezzotint) | John Fletcher (mezzotint) |
| George Andreas Agricola (mezzotint) | Gerbrand van Leeuwen (engraving) |
| J. C. Dyer (engraving) | Wilson Fox (photogravure ?) |
| Fra Douce (mezzotint) | Daniel Turner (mezzotint) |
| G. Darling (mezzotint) | James Scott (mezzotint) |
| Barth. Dominiceti (engraving) | John Scott (mezzotint) |
| Antonius D'Aquin (engraving) | Christian Gottlieb Selle (mezzotint) |
| Isbrand Diemerbroeck (etching) | Edmund King (mezzotint) |
| Galen Abrahamsz (engraving) | |

- Johannes Jacob Seubert (etching)
 Ludolph Smids (mezzotint)
 Alexander Small (mezzotint)
 Samuel Sobiere (etching)
 Rudolph Siltemann (mezzotint)
 John Sims (mezzotint)
 Joseph Thackeray (mezzotint)
 John Thomson (mezzotint)
 Robert Bentley Todd (mezzotint)
 Vopiscus Fortunatus Plempius (etching)
 Henry Prude (mezzotint)
 Charles Peters (etching)
 T. G. von Pempelfurt (mezzotint)
 Giovanni Battista Paletta (engraving)
 I. S. Ogle (?) (lithograph)
 Friederich Hermann Ludewig Muzell (engraving)
 Thomas Morrison (mezzotint)
 Robert Morison (etching)
 Joannes Baptist Morin (etching)
 Johannes De Mey (etching)
 Jacques Mentel (etching)
 W. Mensert (lithograph)
 Meissner (etching)
 Richard Mead (mezzotint)
 Alexander Marcet (lithograph)
 Maclean (mezzotint)
 Sir James McGregor (mezzotint)
 Lushington (lithograph)
 Sir James Leighton (engraving)
 I. N. Lieberkuhn (etching)
 John Latham (lithograph?)
 Sir William Knighton (mezzotint)
 Joseph Francois Kluyskens (lithograph)
 Polycarp Gottlieb Schacher (etching)
 Johannes Wilhelm Widmann (etching)
 Johann Jacob Wepfer (etching)
 Georg Michael Wepfer (mezzotint)
 Johann Conrad Wepfer (etching)
 Arnold Weickard (etching)
 Richard Warren (mezzotint)
 Pelham Warren (mezzotint)
 Ferdinand Friedrich Wallraf (mezzotint)
 Adolf Vorst (etching)
 Joannes Georg Volcamer (etching)
 Joseph Julien van Roosbroeck (lithograph)
 C. A. van Coetser (lithograph)
 Antonius Vallot (etching)
 Octavian Ploss (mezzotint)
 Theodore Zuinger (etching)
 Forbes B. Winslow (mezzotint)
 William T. Bull (engraving)
 D. B. St. John Roosa (etching)
 Imanuel Capadoce (etching)
 Woodward (mezzotint)
 Alexander Wood (lithograph?)
 Michael Gottfried Wittber (mezzotint)
 Wildberger (lithograph)
 Erasmus Wilson (mezzotint)

FRAMED PORTRAITS

PRESENTED BY DR. REGINALD H. SAYRE, JANUARY, 1925

Reginald Harrison (litho-graph)	Arthur G. Dunham (photo-graph)
A. Armstrong (lithograph)	John Hunter (etching)
Samuel Cooper (mezzotint)	A. Denman (mezzotint)

PROGRAMS OF STATED MEETINGS

Scientific programs for the Stated Meetings of the Academy to be held during the current year have been arranged as follows:

March 5th

Typhoid fever in New York

1. Features of public health interest in relation to the recent typhoid fever outbreak.

LOUIS I. HARRIS

2. The points of interest to the practicing physician in the methods of fecal examination for B. Typhosus as carried out by the health department.

CHARLES KRUMWIEDE

3. Clinical observations during the recent outbreak of typhoid fever.

WARREN COLEMAN

March 19th

Program arranged in cooperation with the Section of Ophthalmology.

Symposium on headache.

1. Ocular headache.

GEORGE E. DE SCHWEINITZ, Philadelphia

2. Headache from the viewpoint of the neurologist.

FOSTER KENNEDY

3. Headache of nasal origin.

R. H. SKILLERN, Philadelphia

4. Headache from the viewpoint of the internist.

LUDWIG KAST

April 2nd

1. The application of surgery in the treatment of mitral stenosis.

CLAUDE S. BECK, Cleveland, Ohio

2. The surgical relief of cardiac pain.

WILDER PENFIELD

3. The indications for surgical procedure in heart disease.

SAMUEL A. LEVINE, Boston

April 16th

Program arranged in cooperation with the Section of Neurology and Psychiatry.

May 7th

Program presented by the New York Post Graduate Medical School and Hospital.

May 21st

Program presented by the Loomis Sanitarium.

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